

ARGUS 125

Manual

Version 2.1/**EN**

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1 Introduction

The ARGUS 125 premium ISDN tester is a combitester which has not only the test functions needed to support the installation and maintenance of BRI, 2Mbit/E1, PRI and U-interface accesses but also those needed for POTS accesses.

In particular, service technicians, who increasingly work on larger, networked telephone systems and switching systems, will quickly find the ARGUS 125 an indispensable tool. With its rechargeable batteries and internal charger, the ARGUS is exceptionally well suited for use in field service. The intuitive menu operation combines convenient cursor keys and softkeys with a multi-line backlit display.

Besides TE/NT simulation on BRI and PRI accesses, the ARGUS 125 also supports TE simulation on U interfaces (optional) and POTS as well as convenient BRI and PRI D-channel monitoring. The 16 megabytes of internal flash memory enables the tester to record and save the monitoring data without requiring a connection to computer.

The Flash-ROM technology permits you to upgrade your ARGUS at any time by download software updates from a PC. Free software updates are available at www.argus.info.

If you use the ARGUS on a BRI or PRI interface in an ISDN system whose specifications deviate from the (DIN ETS 300 102) standard (e.g. some networked PBXs), you must take these manufacturer specific modifications into account. In such cases, please contact the distributor of your ISDN PBX for assistance.

As an option, a V5.x monitor is available for the ARGUS 125: This monitor can be used to record the V5.1 or V5.2 protocol, which can then be decoded in detail with the WINAnalyse software.

An optional MegaBERT is available for the ARGUS 125. This option extends the bandwidth of the bit error rate test to a full 2 Mbit/s – either on all 32 time slots (2Mbit unframed) or with 1984 kbit/s on time slots 1 to 31 (2Mbit framed).

The integrated USB interface supports the rapid transfer of data between the ARGUS and a PC or notebook.

The ARGUS Functions - Overview:

Protocol Recognition and B-Channel Test for ISDN Accesses

After you select the operation mode, the ARGUS will automatically determine the protocol supported by the access under test and will then test the availability of the B-channels.

Telephone connections

Can a telephone call be placed from this access to every other number and/or can this access receive a call?

Service tests

Does the tested access support connections with the most important services, such as, ISDN telephone service, Group 4 - Facsimile or data transmission at 64 kbit/s etc.?

Additionally, three user-specific services can be saved in the ARGUS and tested on the access under test.

Bit error tests (BERT) for PRI/E1, BRI, U-interface accesses with evaluation in accordance with G.821 and G.826

Performs a BERT in an extended call to itself, via a loopbox or in end-to-end operation. The ARGUS will, if needed, handle the loopbox function itself.

The integrated MegaBERT extends the bit error test on E1/PRI accesses to a full 2 Mbit/s bandwidth. Any distribution of time slots ($n \times 64 \text{ kBit/s}$) may be used.

Supplementary Services

The ARGUS automatically tests the supplementary services made available by the exchange.

Leased Line Tests – tests permanent circuits with BERT and speech

NT simulation of a BRI- or a PRI access

D-channel monitoring on the Basic and Primary Rate Interfaces

All of the D-channel signals are captured and passed to the serial interface. When passively monitoring, the ARGUS does not affect Layer 1.

CF Interrogation

The ARGUS will check, whether a call diversion has been setup on the access under test. The ARGUS can setup or clear down call diversions in the exchange.

MSN interrogation (only on a BRI access)

On a P-MP access using the DSS1 protocol, the ARGUS will determine the MSNs of the access under test.

POTS (analog) Functionality

Tests CLIP and other Caller-ID services in accordance with ETS 300 659/778.

Monitoring an analog line (passive listening-in)

POTS - Voltage and Polarity Measurement

The Access Acceptance Report

When the ARGUS is linked to a PC via the USB (or optional serial) interface, it is, as an example, possible - with the aid of WINplus - to create and print a comprehensive test report on the PC.

Testing Features via the Keypad

Supports manual tests in the so-called keypad mode. If the network supports this feature, the user can send a command sequence and can then test service features in a dialog.

Should you have any further questions, please contact us:

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2 Safety Instructions

The ARGUS may only be used with the included accessories. Usage of other accessories may lead to erroneous measurements and may even cause damage to the ARGUS and the connected installation. The ARGUS is only to be used in accordance with the instructions in this documentation. Any other usage may result in bodily injury and destruction of the ARGUS.

- To prevent electrical shocks or damage to the ARGUS, do not connect it to lines with voltages in excess of 100 V!
- Never attempt a measurement with the case open!
- The ARGUS is not watertight. Protect the ARGUS from exposure to water!
- Before replacing the rechargeable batteries (see page 16 Replacing the accumulators), disconnect all the test leads and switch the ARGUS off. Make certain that the polarity is correct when connecting the accumulators!

Return and environmentally acceptable disposal

ARGUS is not subject to the RoHS (EU Directive on the "Restriction of Hazardous Substances") guidelines. Since October 2005 in compliance with WEEE (EU Directive on Waste of Electrical and Electronic Equipment) 2002/96/EU and the German Electrical and Electronic Equipment Act (ElektroG - Elektro- und Elektronikgerätegesetz), we have begun

marking our testers with the following symbol () (DIN EN 50419) .

In other words, the ARGUS may not be disposed of in the household waste. Regarding the return of old equipment, please contact our Service department.

3 Technical data

Dimensions and Weight

Height 280 mm, width 84 mm , depth 50 mm and weight 350 gr (without batteries and)

Keypad

25 Keys

LCD display

LCD display with switchable background lighting, 64mm x 40mm, 128 x 64 pixels

Memory

512 KBytes of RAM
16 MBytes of Flash memory for recording and storing of data from monitoring

Inputs / Outputs

1 RJ-45 for BRI, PRI
1 RJ-45 for POTS and U-interface

1 DC jack for an external power supply
USB-A jack USB Client interface
1 RJ-11 for the serial interface (optional)
2.5mm jack for headset

Temperature Ranges

Ambient-temperature: 0 °C to +50 °C
Operational limits temperature: -5 °C to +55 °C

Power Supply

4 NiMH AA accumulators or
ARGUS plug-in power supply

4 Operation



Power key

- Switch the ARGUS ON
- To start up again after a power down (adjustable see page 132)
- To switch on the display backlighting
In battery mode to save power, the backlighting will switch off automatically after 5 seconds (adjustable see page 132).
- Switch off the ARGUS (must be pressed somewhat longer)
If the ARGUS is connected to its power supply, it will automatically charge the accumulators when switched off (see page 136 Accu Servicing).



Confirmation key

- Open menu
- The ARGUS will open the next display.
- Start the test
- Confirm the entry



Return key

- The ARGUS will return to the previous display and ignore any entries made at this level, e.g. changes to the settings
- Test - interrupting



Cursor keys

- Scroll through the display lines (vertical cursor keys)
- Scroll through a display line (horizontal cursor keys)
- Select a menu
- Select a function or a test



Telephony

- Pickup or hang up
- Simplified overlap signalling: press the telephone key twice



Layer 1 measurement

- start the Layer 1 measurement (level/voltage)



Numerical keypad

- Entry of the digits 0....9, letters and special characters
- Direct function call



Soft keys

- The function of the 3 softkeys varies with the situation. The current function of each softkey is shown in the bottom, highlighted line of the display.

The ARGUS is in largest part operated with the 4 cursor keys, the confirmation key ✓, the return key X and the three softkeys.

The current assignment of the three softkeys is shown in the lower line of the display.

On the following pages, only the softkey's meaning in the respective context is shown - enclosed in brackets < >, e.g. <NO>. The <✓> softkey serves the same function as the ✓ confirmation key and the <↓> softkey performs the same function as the corresponding arrow key on the ARGUS keypad.

Connectors at top



PWR

Connection for the external plug-in power supply.

If the plug-in power supply is connected, the ARGUS will disconnect the accumulators and, when it is switched off, the ARGUS will automatically recharge the accumulators (see page 136 Accu Servicing).

SER. (optional)

Serial interface to connect a PC

USB

USB interface to connect a PC



Connector for a headset

Connections at bottom



BRI/PRI/E1

Connection for a BRI/PRI network

BRI: pins 3/6 and 4/5

PRI: pins 1/8 and 2/7

Line

Connection for a POTS or U-interface network
(pins 7 and 8)

Replacing the accumulators

The compartment for the four accumulators (rechargeable batteries) is located on the back of the case. Unscrew the screws to remove the cover of the case and insert the accumulators in accordance with the polarity marking. Use only the accumulators included in the package. The current state of the charge will (if the ARGUS is not connected to a power supply) be displayed graphically.

In the LCD display, a battery symbol will begin to blink, when there is still approximately (depending on the mode of operation) 15 minutes reserve. During this period, it is possible that there may be audible interference and in rare cases even malfunctions (see page 136 Accu Servicing).

Power Down



In accu operation, if the ARGUS is idle for 15 minutes (adjustable see page 132), it will automatically switch to the power-down mode (power-down). The ARGUS will remain in power-down mode until the Power-Key is pressed again. Reasonably enough, the ARGUS will not enter power-down mode during a test (e.g. Loopbox) or when it is in Trace mode.

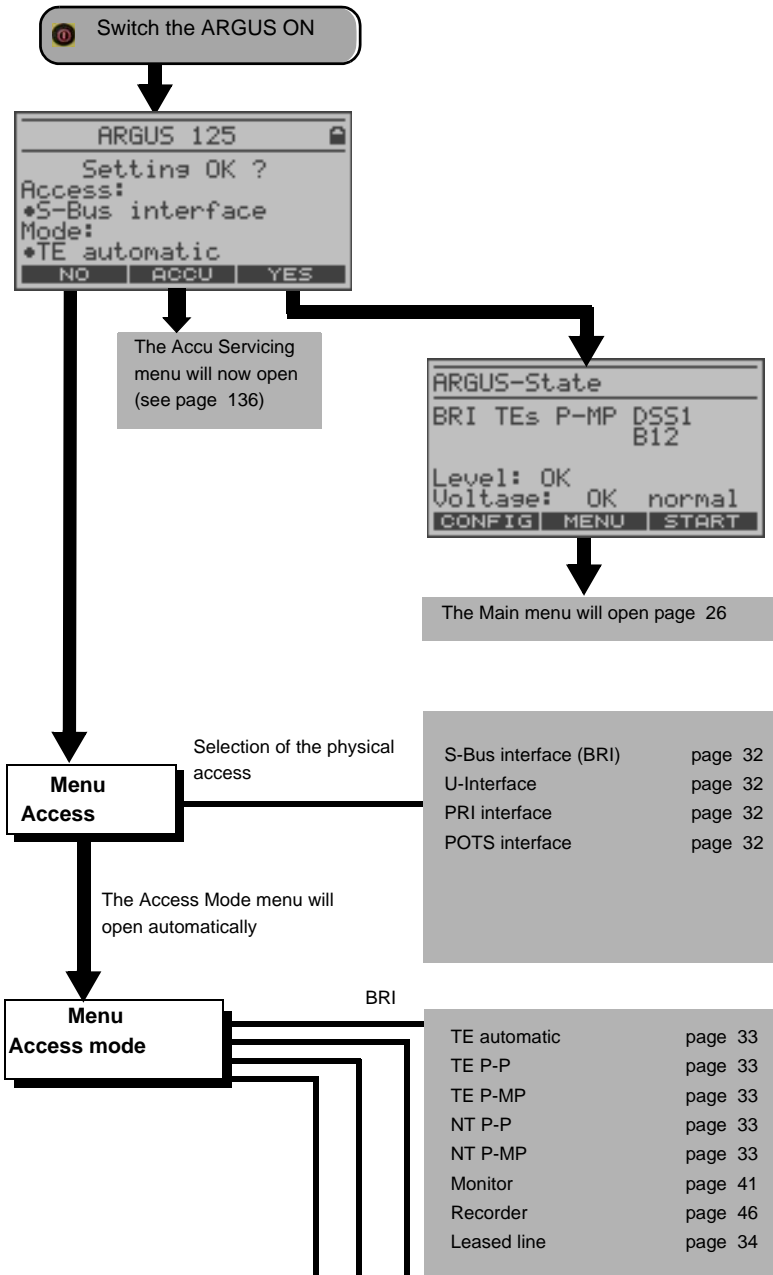
As an alternative, it is possible to operate the ARGUS using the included power supply. When the power supply is connected, the accumulators are automatically disconnected.



Unplug the power supply from the mains, as soon as the ARGUS is no longer in use and switched off.

Regardless of the type of supply used, you should always operate the ARGUS with accumulators installed. This will ensure the uninterrupted operation of the real-time clock.

5 Menu Hierarchy



U-interface	TE automatic	page 33
	TE P-P	page 33
	TE P-MP	page 33
	Leased line	page 34
POTS	POTS terminal	page 52
	POTS monitor	page 55
PRI	TE P-P	page 33
	NT P-P	page 33
	Monitor	page 41
	Recorder	page 46
	Leased line	page 34

BRI, U, PRI

Menu

Single tests

Bit Error Testpage 57

Supplementary Servicespage 66

Service testspage 71

X.31 Testpage 74

CF Interrogationpage 77

CF Activationpage 79

CF - Deletepage 80

MSN interrogation (only on a BRI or U-interface)page 81

Connection display.page 87

Traffic generator (PRI access only)page 82

Time measuringpage 84

POTS

POTS telephonypage 53

BERT start

BERT wait

B-channel loop

Automatically / Manually

Conn. up time

B-channel delay

Interchannel delay

Menu Test Manager	BRI, U, PRI	Start new one	page 97
		End all	page 100

Management of multiple, simultaneous and independent tests/connections

Menu Test Results	Start	page 103
	View	page 107
	Test data to PC	page 108
	Delete	page 108
	All tests to PC	page 109

The ARGUS will display the saved test results and send them to the connected PC.
If selected, the ARGUS will execute the test(s) automatically.

Menu Level Measuring	BRI	Remote end other TE	page 110 page 110
	POTS	POTS a/b polarity	page 114
	U-interface	Voltage U	page 112
		Power U	page 112

Menu L1 status

The ARGUS displays the current status of the Layer 1 on a BRI access (page 115) and the Layer 1 parameter on a PRI access (page 116).

**Menu
Settings**

The ARGUS can be configured to suit your special requirements.

The parameters are clearly organised in submenus (e.g. all the ISDN parameters are in the ISDN submenu)

The default (factory) settings can be restored by selecting "Reset".


PC/Trace	page 119
ISDN	page 120 <ul style="list-style-type: none">- L1 permanent?- Protocol- Alerting mode- Clock mode- BRI termination- PRI termination- PRI Monitor- Sensitivity- Setting the Sa5 bits- Setting the Sa6 bits- Setting the A-Bit- CRC4 Mode- Call parameter- Services- Call accepted- Voice coding- DTMF / Keypad- Destination number MSN <ul style="list-style-type: none">- CUG Index- Keypad
BERT	page 126 <ul style="list-style-type: none">- BERT time- Bit patt. BRI/U- Bit patt. PRI- Error level- HRX value
POTS	page 128 <ul style="list-style-type: none">- POTS dial- POTS CLIP- DTMF parameter- FLASH time

X.31	page 130
	- TEI
	- LCN
ARGUS settings	page 131
	- Menu language
	- LCD contrast
	- Date entry
	- PC Interface
	- V.24 Baud rate
	- Alarm
	- Power Down
	- Software option
Numbers	page 133
Reset	page 134

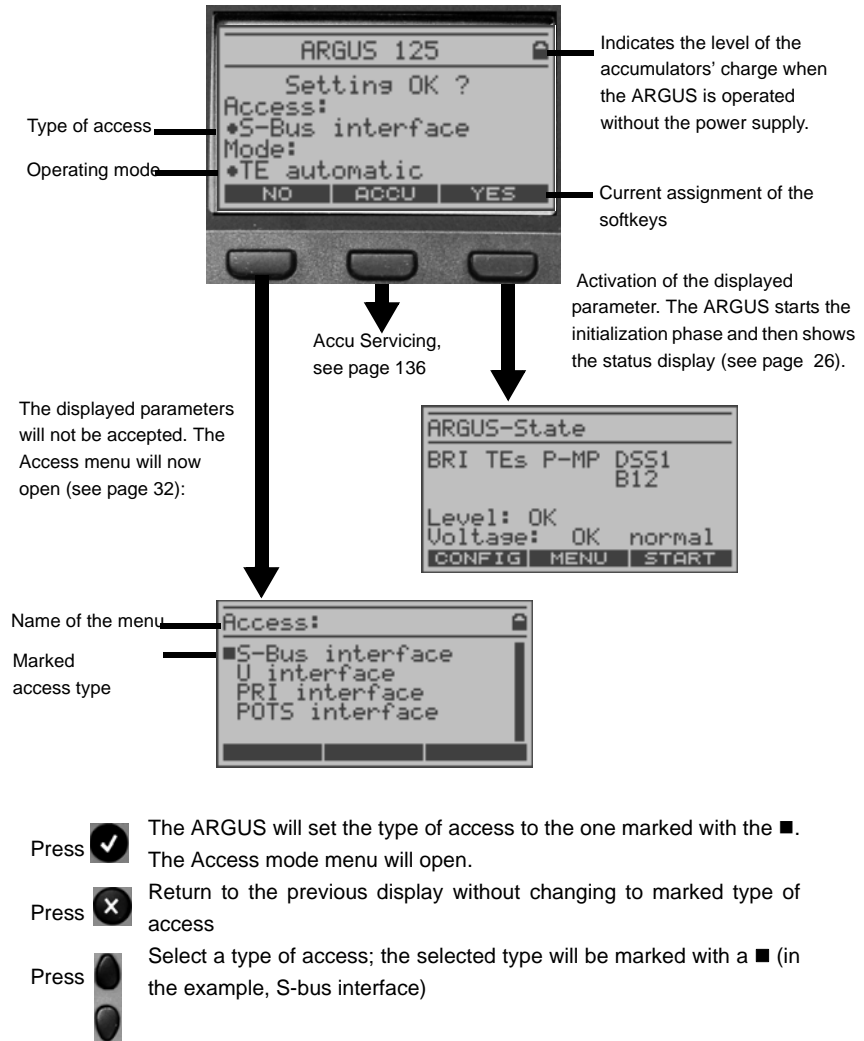
Menu Accu Servicing

Loading	page 136
Discharging & Charging	page 136
Trickle charge	page 136

6 Start-Up

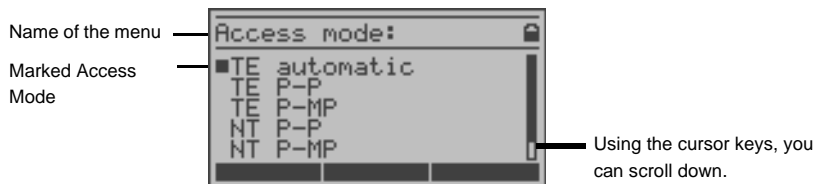
Using the included cable connect the ARGUS to the access to be tested and then switch the ARGUS on by pressing the -key.

The ARGUS displays the access and mode parameters which were last selected.



In the Access menu, use the cursor keys to select which type of physical access is to be tested.

Afterwards, the Access Mode menu will open automatically (see chap. 8 page 33).



Press The ARGUS will set the type of access to the one marked with the ■. Afterwards, the ARGUS will start the initialisation phase.

Press to return to the previous display without changing to the marked type of access

Press Select a type of access; the selected type will be marked with a ■ (in the example, TE automatic)

Initialization phase:**- Initialization on a BRI or U-Interface access**

Next the ARGUS will setup Layer 1. While it is setting up Layer 1, the "L1 Sync" LED above the display will blink. If the ARGUS cannot setup Layer 1, it will display the message "No Net". When the ARGUS is operated on a U-interface access, it can take up to 2.5 minutes to activate Layer 1. As soon as Layer 1 is successfully setup, "L1 Sync" LED will light continuously.

Once Layer 2 has been setup, the "L2 Rx/Tx" LED will light.



If both modes (P-P / P-MP) are found when Layer 2 on the D-channel is checked, the mode must be selected manually (see page 33).

If everything has been correctly detected, the ARGUS will display the type and mode of access found. Additionally, a qualitative assessment of the level will be displayed.

The ARGUS will automatically determine the protocol (in both TE and NT mode) or use the protocol set manually (see page 120 Protocol). On a bilingual access, the ARGUS will use the DSS1 protocol.

The "L3 Conn" LED will light after the ARGUS has setup Layer 3. At the same time the ARGUS will start the B-channel test. The results will be displayed on the ARGUS. If an error occurs in the B-channel test (e.g. access is not plugged-in), the ARGUS will - depending on the class of error - either repeat the initialization or show an error message (see page 145). The ARGUS will then idle in the Status display.

Example:
State display on a BRI access

```

ARGUS-State
BRI TEs P-MP DSS1
          B12

Level: OK
Voltage: OK normal
CONFIG MENU START
    
```

Main Menu

```

ARGUS125
■Single tests
  Test manager
  Test reports
  Level measuring
  Li state
    
```

The ARGUS displays the following:

- Access type (e.g. BRI)

- Access mode

NTs	NT Simulation Slave Mode (see page 121)
NTm	NT Simulation Master Mode
TEs	TE Simulation Slave Mode
TEm	TE Simulation Master Mode

- Bus configuration (D-channel Layer 2 mode)

P-P	Point-to-Point
P-MP	Point-to-Multipoint

D-channel protocol (in the example, DSS1)

- The availability of the B-channels:

B12	Both B-channels are available
B1-	Only B-channel 1 is available
B-2	Only B-channel 2 is available
B--	No B-channel is available

- Level and voltage evaluation

OK normal	Level/Voltage is OK
<<	Level/Voltage is too low
>>	Level/Voltage is too high
--	No level/voltage
OK Rev	Emergency supply
<START>	Repeat the B-channel test.
<CONFIG>	The ARGUS will open the ISDN Settings menu (see page 120).



If only one B-channel is available, this can have an impact on the service check and the testing of the supplementary services.

It must be mentioned again, that the ARGUS only determines the general bus status once when switched on or when the ARGUS first connected. On the other hand, the status of the protocol stacks for Layer 1, 2 and 3 will be continually monitored and displayed.

- Initialization on a PRI access

As soon as Layer 1 is successfully setup, the "L1 Sync" LED will light continuously. The ARGUS will automatically determine and display, whether or not the PRI access uses CRC4-monitoring. CRC4 monitoring can be switched on or off manually (see "CRC4 mode" on page 123.).

The ARGUS will begin to automatically determine the access configuration. After Layer 2 is setup, the "L2 Rx/Tx" LED will also light.

The ARGUS will, regardless of the mode of operation (TE or NT mode), determine the D-channel protocol and attempt to setup Layer 3.



During this phase, the ARGUS displays the A bit of the remote side and the FAS. The protocol can only be determined when the A bit is not set (+). FAS (Frame Alignment Signal): Indicates whether the ARGUS could correctly synchronize with the incoming 2 Mbit data stream's alternating frame identification word or message word and the, perhaps present, CRC4-superframe structure.

Afterwards, the ARGUS will start the B-channel test. The ARGUS will check the availability of all 30 B-channels by placing an outgoing call on each B-channel one after the other. If the ARGUS can place a call on a B-channel, it will be assumed that the B-channel is available in both directions; the B-channel test cannot distinguish between alternating and exclusively "outgoing" B-channels. If the connection is rejected with Cause 44 (see Appendix B), the B-channel will be assumed to be only available for incoming calls. If the connection is rejected for any other cause, the B-channel will be identified as unavailable. In the case of a cause, which indicates that the B-channel is occupied, the connection will be tried up to two times and, if a connection can still not be setup, it will then be marked as unavailable.

An example:

State display on a PRI access



The ARGUS displays the following:

- Type of access
- Access Mode
- Bus configuration:
- D-channel protocol

- The availability of the B-channels

Available B-channels: The light squares indicate the available B-channels and are ordered in six blocks of 5. The upper row of squares represent the B-channels that are available for outgoing connections, the lower row represents those that can be used for incoming calls.

left: B-channel 1

right: B-channel 30

In the example, all 30 B-channels are available and can be used for outgoing or alternating connections.

- CRC4-monitoring, A-Bit, FAS

B-channel test – example:



The ARGUS is in TE-Simulation Slave mode. B-channel 11 is not available.



The first 10 B-channels are configured in the exchange as incoming channels only (seen from the viewpoint of the terminal), while B11-B30 can be used for outgoing or alternating connections.

If the ARGUS is not properly connected (e.g. incorrect cabling) or the network is not in order, the ARGUS will display “No Net”.

- State display on a POTS access



The ARGUS will display the voltage when idle.

- State display on a U-interface access



The ARGUS will display

- the type of access
- the access mode
- the D-channel protocol
- the U-interface variant
- the availability of the B-channels and
- the voltage when idle.

The ARGUS Main Menu

For clarity, all of the available “actions” (commands) are logically organised in menus. All of the menus, which are available for the type of access under test, are listed in the Main menu.

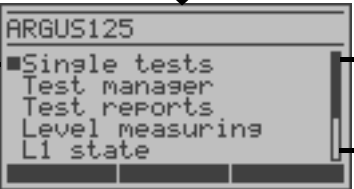
ARGUS State display



Repeat the B-channel test.

Main menu

Marked menu



The display currently shows the top line of the list.

The list continues. Using the cursor keys, you can scroll down.



to have the ARGUS open the menu marked with the ■.

to select a menu. The selected menu is marked in the display with a ■.

to return to the previous menu (in the example, the State display).

Available menus

PRI access	BRI or U-interface access	POTS access
Single Tests	Single Tests	Single Tests
Test Manager	Test Manager	_____
Test results	Test results	Test results
_____	Level measuring	Level measuring
L1 state	The L1 state (BRI only)	_____
Configuration	Configuration	Configuration
Access	Access	Access
Accu servicing	Accu servicing	Accu servicing

Using the numeric keys to start a test or function:

Using the numeric keys, you can start important ARGUS functions directly, regardless of the currently active menu level:

BRI and PRI accesses:

Numeric key 2	Start the service check	(see page 71)
Numeric key 3	Start the suppl.serv.test	(see page 66)
Numeric key 4	Start the AutoTest	(see page 103)
Numeric key 5	Send test results to a PC: Start connection	The measurement report last saved or displayed will be sent to the connected PC.
Numeric key 6	Open the Test Manager	(see page 96)
Numeric key 7	Open the Speed-Dialing Memory	(see page 133)
Numeric key 8	Set to Trace mode	(see page 119)
Numeric key 9	Start the bit error rate test (BERT)	(see page 57)



If a function is called where the ARGUS expects the entry of a digit, pressing a number key will be interpreted as the expected input.

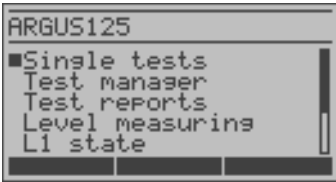
7 Setting the Type of Access

If the parameters displayed at power on are not accepted, the Access menu will open automatically. However, you can also open the Access menu at any time from the Main menu.

In the Access menu, the user must select the type of physical access to which the ARGUS is actually connected. When the ARGUS is restarted, the settings used last will be suggested as the default.

If you use the ARGUS on a BRI in an ISDN system, whose specifications deviate from the (DIN ETS 300 102) standard, such as those of some networked PBXs, you must take these manufacturer-specific modifications into account. In such cases, please contact the distributor of your ISDN PBX for assistance.

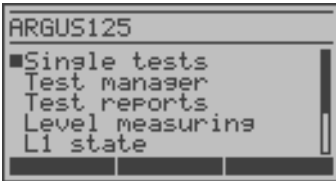
ARGUS State display



Open the Main menu



Using the cursor keys select the Access menu.



Using the cursor keys mark the desired type of access.



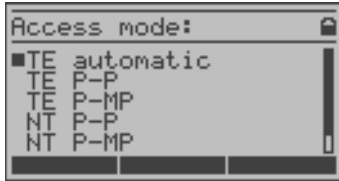
Press to confirm your selection
The Access Mode menu will open automatically (see page 33).

The following applies for all displays:



The ARGUS will return to the previous display and ignore any changes to the settings.
In this case, the ARGUS would e.g. use the "old" access.

8 Selecting the Access mode



The Access mode menu is not selectable from the Main menu.

It opens automatically once the physical access is selected in the Access menu.

Using the cursor keys, select the desired Access mode.



Confirm the Access mode

The ARGUS will open the State display.

8.1 Operation on a BRI, U-Interface or PRI access

8.1.1 TE-Simulation mode

TE automatic

On a BRI or U-interface access, the ARGUS will automatically determined the D-channel Layer 2 mode (PP or P-MP). If the ARGUS determines that the access supports both modes, a configuration menu will open in which you can select the desired L2 mode

TE P-P or TE P-MP

Afterwards, the access and the protocol stack will be initialized in accordance with the selected setting. When the ARGUS finds a PRI access, it will enter P-P mode.

8.1.2 NT-Simulation mode

NT P-P or NT P-MP

Afterwards, the access and the protocol stack will be initialized in accordance with the selected setting. When the ARGUS finds a PRI access, it will enter P-P mode.

8.1.3 Permanent switch circuit (leased line)

Besides dial-up connections to any subscriber, ISDN also supports the use of permanent circuits switched to a specific remote location (leased lines). These leased lines (permanent circuits) are available after setting up Layer 1, in other words after synchronizing both terminals by exchanging HDLC-frames. The location where the clock is generated can be selected see "Clock mode" on page 121. As a quick test of a leased line, you can simply call the opposite end using a selected B-channel. However, for a more revealing test of a leased line, you should perform a bit error rate test.



Both ends of the leased line (permanent circuit) must use the same channel.

8.1.3.1 Telephony on leased lines

■Access mode:

The ARGUS - Main menu



■Permanent switch



State display:
BRI LLs

Display the LL(s) in the State display.



The ARGUS will open the B-channel selection.
The ARGUS displays the B-channels available. Use the vertical cursor keys to select a B-channel or enter the number of the B-channel on the keypad (first press < DEL>).



The ARGUS will setup the phone connection and display the B-channel used together with the duration of the leased line connection (permanent switch circuit) in hours:minutes:seconds.

< LOUD > Increases the volume.
or

< QUIET > sets it back to "Normal".

< TM > Start Test Manager (see page 96).
Another connection can be setup.

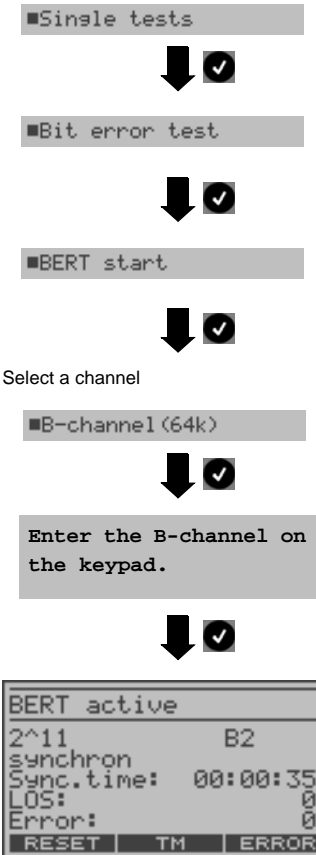


Disconnect.
The ARGUS will open the State display.

Alternatively, in the Single tests menu, select Connection.

8.1.3.2 BERT on leased lines (permanent circuits)

On a BRI access:



A number of variations are possible in testing the permanent circuit with the bit error rate test.

In the simplest case, a B-channel loop will be set up at the remote end.

After selection of the channel to be tested (B-channel or D-channel), the ARGUS will send the test pattern, receive it back and evaluate it accordingly.

The displays and operation are, in largest part, similar to those of a BERT on a dial-up connection (see page 57) with the exception that you need not enter call numbers or select a service.

In the case of a BRI access in end-to-end mode (page 57 and page 64), it is also possible to run a BERT in the D-channel with HDLC-framing (setting: D-channel transp.).

Optional:

128k BERT on a BRI or U-interface permanent circuit



Select a B-channel

Start BERT

The ARGUS will display

- the bit pattern, B-channel used and the bitrate
- Synchronicity of the bit pattern (synchron)
- Sync.time in h:min:sec (the period of time that the ARGUS has been synchronised)
- LOS counter
- the bit errors that have occurred

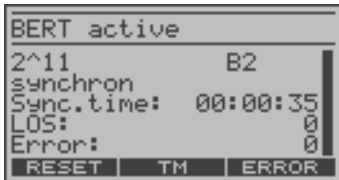
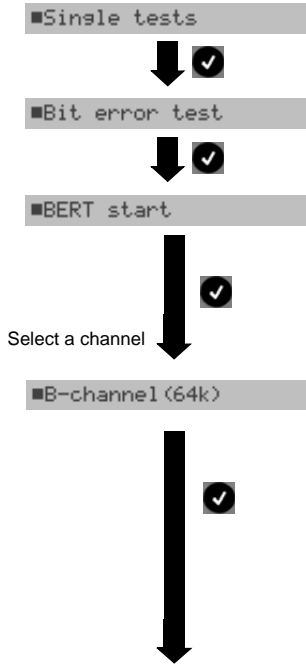
< **ERROR** > to insert artificial bit errors to test the reliability of the BERT.

< **RESET** > The test time and bit error counter will be reset.

< **TM** > Start Test Manager (see page 96).

Once it is over, the ARGUS will display the results of the BERT (page 60). For information on saving the test results, see page 62.

On a PRI access:



In the case of a PRI access in end-to-end mode (see page 59 and page 64), a BERT can be run

- in the D-channel
- in a B-channel (channel selection: B-channel (64k))
- in two B-channels (channel selection: B-channel (128k))
- MegaBERT framed (optional: in all B-channels and in the D-channel)
- MegaBERT unframed (optional: all B-channels, the D-channel and time slot 0)

The channel select mask will open.

In the channel select mask, use the vertical cursor keys to select the first B-channel (or first press and then enter the number of the first B-channel on the keypad).

Then press .

Afterwards, enter the second B-channel.

Start BERT

The ARGUS will display

- the bit pattern, B-channel used and the bitrate
- Synchronicity of the bit pattern (synchron)
- Sync.time in h:min:sec (the period of time that the ARGUS has been synchronised)
- LOS counter
- the bit errors that have occurred

< ERROR > to insert artificial bit errors to test the reliability of the BERT.

< RESET > The test time and bit error counter will be reset.

< TM > Start Test Manager (see page 96).

Once it is over, the ARGUS will display the results of the BERT (page 60). For information on saving the test results, see page 62.

Loopbox on a permanent circuit (leased line)

■Single tests



■Bit error test



■B-channel loop



Select a channel



Activate loopbox

The ARGUS can be used as a loopbox on a leased line (permanent circuit).

Channel selection:

The ARGUS will loop either one B-channel (Channel selection: B-channel) or all B-channels and the D-channel (Channel selection: All framed).

In the case of a PRI access, you can also choose "All unframed (optional)" in the channel selection: in which case the ARGUS will loop all B-channels, the D-channel and time slot 0.

The ARGUS will display the B-channel used and the amount of time (in h:min:sec) that the Loopbox has been active.



to deactivate the Loopbox.

8.1.3.3 Time measurements on leased lines

B-channel delay

The ARGUS places a call to a remote loopbox and measures the propagation delay for the data in the selected B-channel. The measurement (continuous measurement) must be terminated manually.

ARGUS in the Single tests menu

■Time measuring



■B-channel delay



B-channel select



```
B-channel delay
avg: 0,63,-- ms
min: 0,61,-- ms
max: 0,65,-- ms
bit: 40 -
```

Enter the B-channel from the keypad (first press) or use the cursor keys to set the B-channel.

Perform measurement

The ARGUS displays the average (avg), the shortest (min) and the longest (max) B-channel delay as well as the average B-channel delay in bits (in multiples of the time required to send a bit at 64 kBit/s).
(The time for sending 1 bit at 64 kBit/s = approx. 15.26 μ s.)

The measurement will be repeated in cycles (continuous measurement).



: to terminate the measurement and display the results of the last measurement

When it is connected to a loopbox, if the ARGUS does not receive the data back within 13 seconds, it will display the message "No LOOP".

Interchannel delay

The ARGUS establishes two separate connections to a remote loopbox. The loopbox sends the respective B-channel data back on the same channel. The ARGUS measures the propagation delay for the data on each of the B-channels and determines the difference between the two propagation delays (interchannel delay). The measurement (continuous measurement) must be terminated manually.

ARGUS in the Single tests menu

■ Time measuring



■ Interchannel delay



B-channel select



B-channel select



```
Interchan.delay
avg: 0,00,-- ms
min: 0,00,-- ms
max: 0,00,-- ms
bit: 0 -
```

B-channel selection on a PRI access only:
Enter the first B-channel from the keypad (first press) or use the cursor keys to set the first B-channel.

Enter the second B-channel from the keypad (first press) or use the cursor keys to set the second B-channel.

Perform measurement

The ARGUS displays the average (avg), the shortest (min) and the longest (max) interchannel delay in msec. as well as the average interchannel delay in bits (multiples of the time required to send a bit at 64 kBit/s) - it takes 15.26 µsec to send a bit at 64 kBit/s).

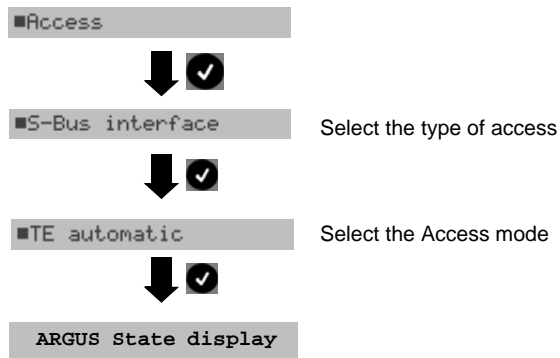
The measurement will be repeated in cycles (continuous measurement).



: to terminate the measurement and display the results of the last measurement

When it is connected to a loopbox, if the ARGUS does not receive the data back within 13 seconds, it will display the message "No LOOP".

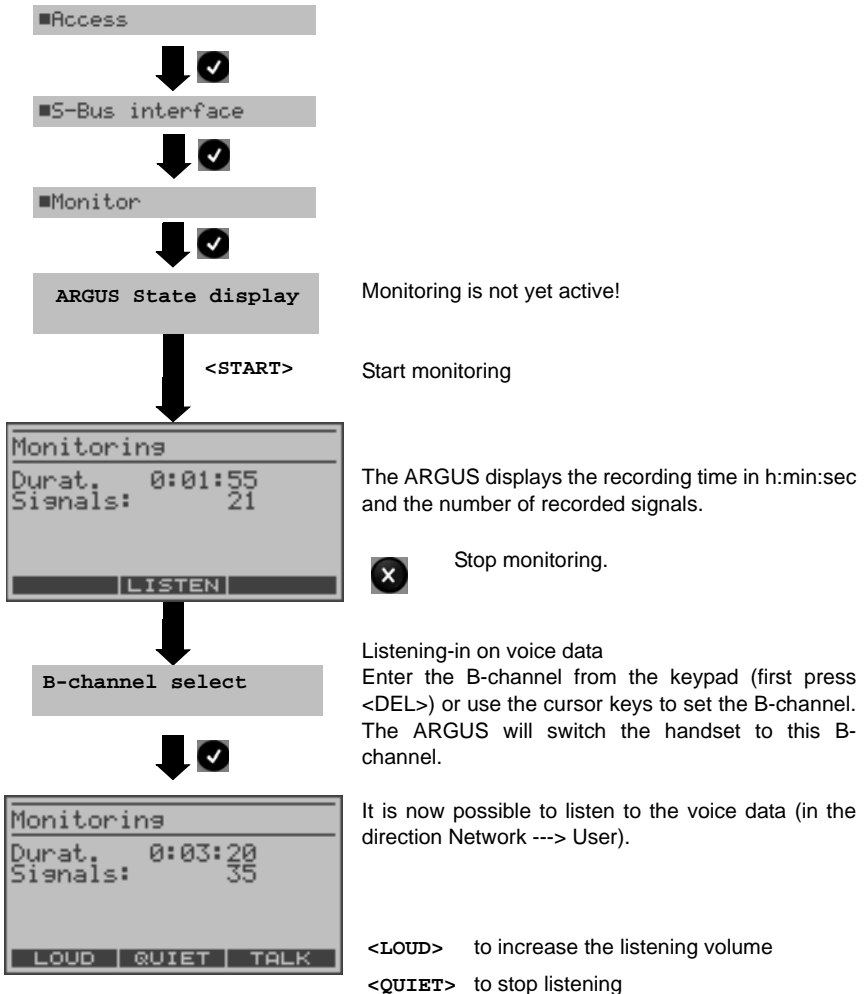
8.1.3.4 Switching from permanent switch mode



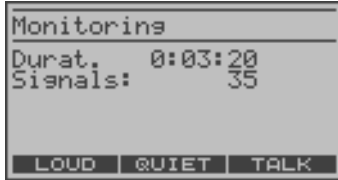
8.1.4 BRI/PRI Monitor

The ARGUS accepts all of the D-channel signals from the BRI or PRI access and sends these D-channel signals over the serial interface to a PC, which must be running ARGUS WINplus or WINAnalyse. The bus and Layer 1 are not influenced by the monitoring.

Monitoring a BRI access

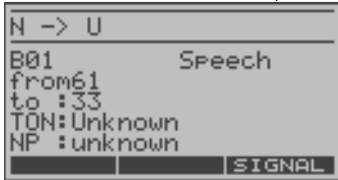


Simultaneous call display while monitoring a BRI access



While monitoring, the ARGUS will search through all of the D-channels signals sent for a SETUP. If a SETUP is detected, the <TALK> softkey will be displayed.

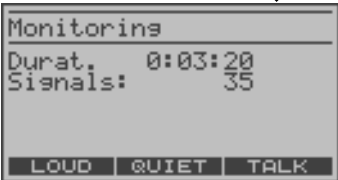
Display the call parameters of the last SETUP received.



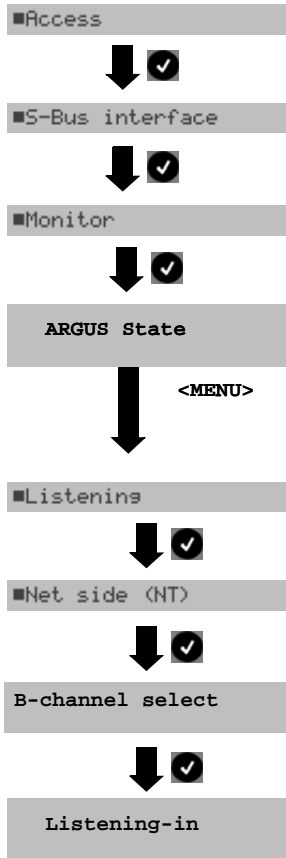
The ARGUS displays the call direction (Net -> User), the channel used (in the example, B01), the service (in the example: Speech), the own number (in the example, 61) and the destination number (in the example, 33).

Display of other parameters:

- Sub-address (SUB),
- User-User-Info (UUI),
- DSP messages (if existent),
- Type of number (TON)
- Numbering plan (NP)



Listening-in when monitoring is not active



Monitoring is not active.

It is possible to passively listen-in on the network-side, the terminal-side or both sides.

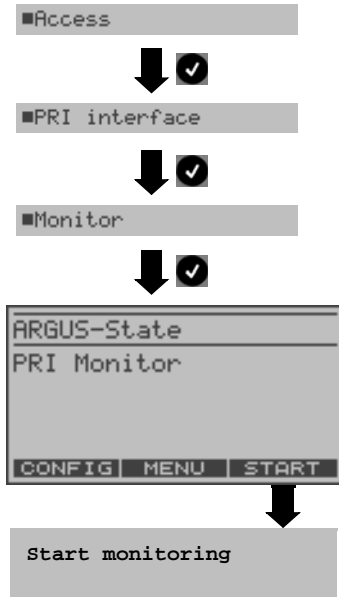
Enter the B-channel



to stop listening-in.
The ARGUS will return to the Main menu.

Monitoring a PRI access:

In the ISDN Configuration menu (see page 122), you can choose whether the ARGUS should monitor the D-channel or just Layer 1 (setting not supported in connection with the V5 option).



As soon as a change occurs, the ARGUS will send a time-stamped report of the following alarms/states to the PC, which will evaluate them:

- Signal
- FAS
- CRC4det
- A bit
- AIS

The ARGUS will check the following values and counters every second and, in the event of a change, will pass them on the PC:

- Sa5-bit (Rx)
- Sa6-bit (Rx)
- E-bit
- Ecnt
- CRC Err.
- Cod.Err.
- Fram.Err.

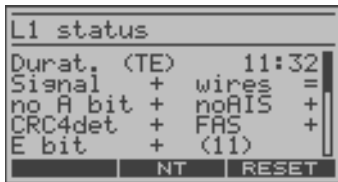
For information on listening-in, see the BRI Monitor.

Display of the L1 Status in PRI Monitor mode

The L1 status function is only available in PRI Monitor mode. The Layer 1 alarms and messages are presented in several windows, which permit detailed statements regarding the state of the PRI access and the transmission line (For further information, see the CCITT/ITU guidelines G.703 and G.704).



The ARGUS is in PRI Monitor mode
Monitoring is not active.



Display of the "TE-side parameters"

Use the cursor keys to scroll through the display.

< NT > Switch to "L1 status NT"; the "NT-side parameters" will be displayed

< RESET > Reset the History function



Quit.

The ARGUS returns to the Main menu.

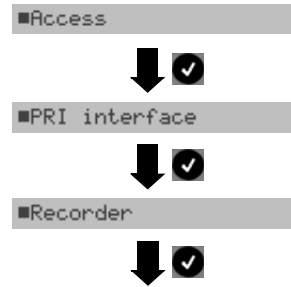
For a comprehensive explanation of the displayed information: see "The L1 Status of a PRI Access" on page 116.

8.1.5 BRI / PRI Recorder

In Recorder mode, the ARGUS passively monitors the connected BRI or PRI access. The ARGUS records all of the D-channel signals sent in both directions without affecting the access or Layer 1.

Unlike in the Monitor mode, the recorded D-channel signals will be saved in the ARGUS's internal Flash memory and not sent to a PC. The storage is organized as a ring buffer, i.e. as soon as the Flash memory is full, the ARGUS will automatically overwrite the oldest data.

Operation on a PRI access:



The ARGUS is in "PRI Recorder" mode. However, it is not yet recording!

Start recording (the "PC/Trace" LED will flash)



The display shows the recording time in h:min:sec and the number of recorded signals.

<LISTEN> The speech path will be switched onto a B-channel. First the B-channel select dialog will open. After selecting a B-channel, it will be possible to listen to the voice data (in the direction Network -> User) on this channel.



Stop recording. The Argus returns to "PRI Recorder" mode

For information on listening-in when not recording: see "Listening-in when monitoring is not active" on page 43.

Parallel call display while recording

The ARGUS searches all of the D-channel signals sent for a SETUP. If a SETUP is detected, the <TALK> softkey will be displayed.

<TALK> Display the call parameters of the last SETUP received (see page 42).

On a PRI , the ARGUS saves a timestamped report of any changes in the following alarms/ states:

- Signal
- FAS
- CRC4det
- A bit
- AIS

The ARGUS will check the following values and counters every second and, in the event of a change, will save them:

- Sa5-Bit (Rx) / (Tx)
- Sa6-Bit (Rx) / (TX)
- E-bit
- Ecnt
- CRC Err.
- CRC rel.
- Cod.Err.
- Cod.rel
- Frm.Err.

For information on passively listening-in when the ARGUS is not recording, see page 43.

8.1.5.1 Administration of the recorded data

In the Recorder mode, several functions are available for administration of the data saved in the Flash memory:

- PC load all
- PC load session
- Internal decoding
- Reset Flash
- Info Flash

PC load all

With the “PC load all” function, the ARGUS will download all of the contents of the Flash memory via the serial interface to the PC, which must be running either WINplus or WINanalyse.



The ARGUS is in “PRI Recorder” mode. However, it is not yet recording!

■PC load all



Start charging the accumulators

The contents of the Flash memory will be downloaded to the PC.



The download is stopped.

Query whether the contents of the Flash memory should be deleted.

After the data has been successfully transferred to the PC, the Flash memory contents can be deleted.
PC load session

< YES > Delete the contents of the Flash memory.

< NO > Do not delete the contents of the Flash memory. The ARGUS will return to the Main menu.



In the ARGUS, the storage in the internal Flash is organized as a ring buffer, which can hold the data from a series of several sessions (i.e. independent trace recordings). At the start of each session, the date and time will be written in the ring buffer.

The “PC load session” function transfers all of the data session-by-session to the PC on which either WINplus or WINanalyse must be running. The time and date that the session was started will be displayed in WINplus/WINanalyse.



The ARGUS is in “PRI Recorder” mode. However, it is not yet recording!

■ PC load session

The loading of the individual sessions will start.



Session will be sent to the PC



The download is stopped.

Query whether another session should be sent to the PC.

Multiple sessions can be transferred to the PC one after the other.

< CONTI. > Send next session to the PC.

Query whether the contents of the Flash memory should be deleted.

After the data has been successfully transferred to the PC, the Flash memory contents can be deleted.

< YES > Delete the contents of the Flash memory.

< NO > Do not delete the contents of the Flash memory. The ARGUS will return to the Main menu.



Internal decoding



The ARGUS will decode the D-channel data stored in the Flash memory.

The ARGUS is in "PRI Recorder" mode. However, it is not yet recording!

Internal decoding



Display the signals sent to the network "<" and to the user ">"

Use the cursor keys to scroll through the display.

< DECODE > Display a detailed presentation (3 levels max.)



Return the next higher mask level or continue to the menu

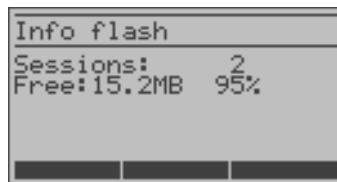
Info Flash



Call up the status of the data in the Flash memory:
- The number of saved sessions
- Free memory in MB and in percent

The ARGUS is in "PRI Recorder" mode. However, it is not yet recording!

Info flash



Display information on the status of the Flash memory.

The number of saved sessions (in the example 2) and the amount of free Flash memory in MB and percent.



Continue to the menu

Reset

Flash



The Reset Flash function will delete the entire contents of the data Flash memory.

The ARGUS is in "PRI Recorder" mode. However, it is not yet recording!

■Reset flash



Query whether the contents of the Flash memory should be deleted.

< YES > Delete the contents of the Flash memory.

The procedure can take several seconds. The ARGUS will show the progress of the procedure as the percentage deleted.

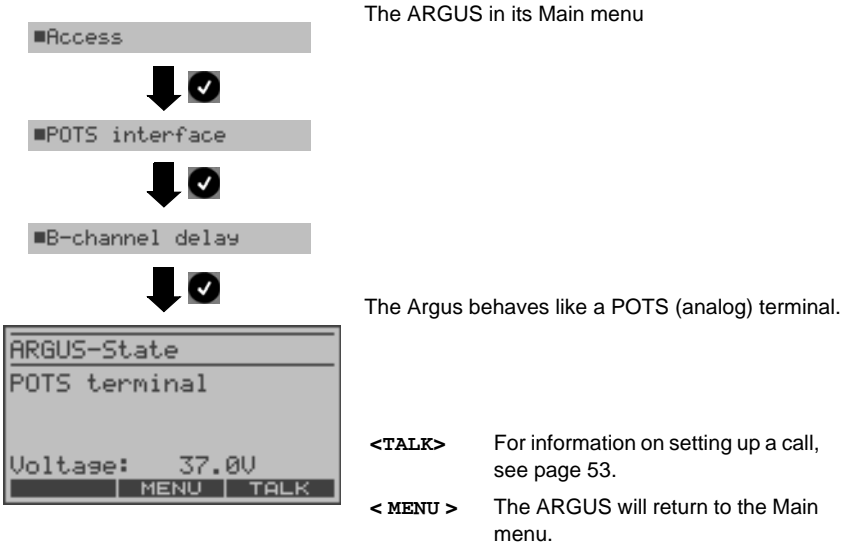
It is not possible to stop the process of deletion!

< NO > Continue to the menu
or
The contents of the Flash memory will not be deleted.



9 Operation on a POTS access

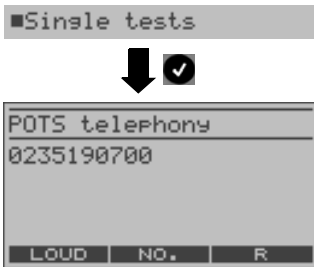
9.1 The ARGUS as a POTS terminal




9.2 Connection on a POTS access

Outgoing Calls

The ARGUS sets up a connection to another terminal. If the terminal is a telephone, the handset integrated in the ARGUS can be used to hold a conversation.



In the Main menu, use the cursor keys to select Single tests or press the  key.

Setup the connection

Enter the number on the keypad. Each of the number's digits will be dialed individually. The ARGUS will display the number dialed.

As soon as the remote party answers, a voice connection will be set up.

The ARGUS will display the charges, if the information is available for the access under test.

- <R> Generates a FLASH signal
- <No.> Select the number from the call number memory or reenter the number on the keypad The last number dialed will always be used as the default (simplified last number redial).
- <LOUD> Increase volume

Clear the connection




or



Clear the connection

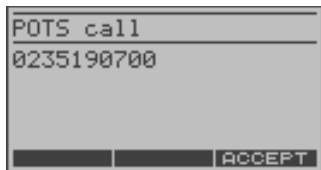


Simplified overlap sending using the telephone key

Press the  key the ARGUS will open the POTS telephony window directly regardless of the currently open menu. Once the call number is entered, the call will be setup.

Incoming Call

The ARGUS signals an incoming call both audibly and on the display.



If the access supports CLIP, the ARGUS will display the number of the caller (see "CLIP mode" on page 128.).

<ACCEPT> Accept the call

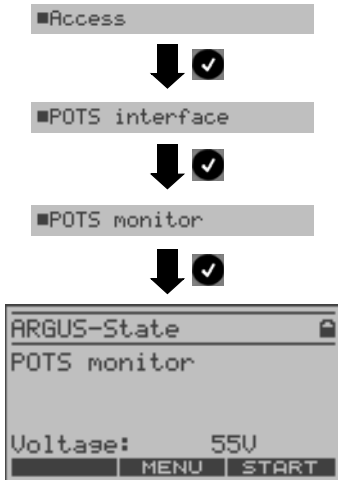
or



9.2.1 POTS monitor

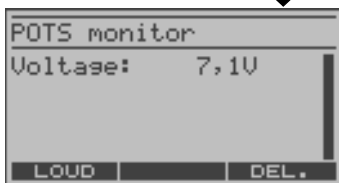
Essentially, the POTS (analog) monitor provides a high impedance tap that does not influence the interface. You can listen to the line with the integrated handset without having the ARGUS send on or otherwise influence the interface.

The ARGUS in its Main menu



The ARGUS displays the voltage level on the line when it is "on hook" (not busy).

Start monitoring



The ARGUS displays the voltage (when "off hook"), the number of the caller (if CLIP is supported) and the DTMF characters dialed by both telephone subscribers and the SMSs received (optional). Any received DTMF-characters will be appended to the line, which will shift left for each character once it is full.

An incoming call will be signalled acoustically. Vertical cursor keys Press to display additional information, if available on the access (e.g. advice of charges).

< **LOUD** > Increases the volume.

< **DEL** > Clears the display.



Stop monitoring.

10 Tests on an ISDN Access

10.1 Bit error test

The bit error rate test (BERT = Bit Error Rate Test) serves to check the transmission quality of the access circuit.

As a rule, the network operator will guarantee an average error rate of 1×10^{-7} , in other words in long-term operation 1 bit error in 10 million transmitted bits. A higher bit error rate will be especially noticeable in transmitting data.

The application program detects the errors in the data blocks transmitted and requests that the remote partner send them again, which reduces the effective throughput of the ISDN connection.

In the bit error test, the tester establishes an ISDN connection to a remote tester or places a call to itself, sends a standardized (quasi-) random number string and compares the received data with that which was sent. The individual bit errors are summed and depending on the test procedure and equipment evaluated in accordance with the ITU Guidelines G.821 and G.826.

During the test, the ARGUS counts the bit errors and after the test is done it calculates the bit error rate and other parameters in accordance with G.821 and G.826. Since the bit error test checks both B-channels in both directions at the same time, both B-channels are required.

As a rule, the quality of the network operator's access circuits is quite good. Therefore, no bit errors should occur in a 1-minute test. However, if an error occurs, the test should be repeated with a measurement time of 15 minutes to achieve higher statistical precision. The access circuit is heavily distorted, if more than 10 bit errors occur within a test period of 15 minutes.

Contact the network operator or the supplier of the PBX equipment and ask them to test your access circuit.

The BERT can be performed in three different ways:

1. BERT in an extended call to oneself

A remote number is not needed, since the ISDN connection is setup to oneself. In this case, the ARGUS requires two B-channels for the test.

2. BERT with a loopbox

A loopbox (e.g., another member of the ARGUS family of testers at the remote end) is required. The test uses one B-channel.

3. BERT end-to-end

This test requires a waiting remote tester such as an ARGUS in the BERT wait mode. (see page 64 BERT wait) A bit pattern is sent to this tester.

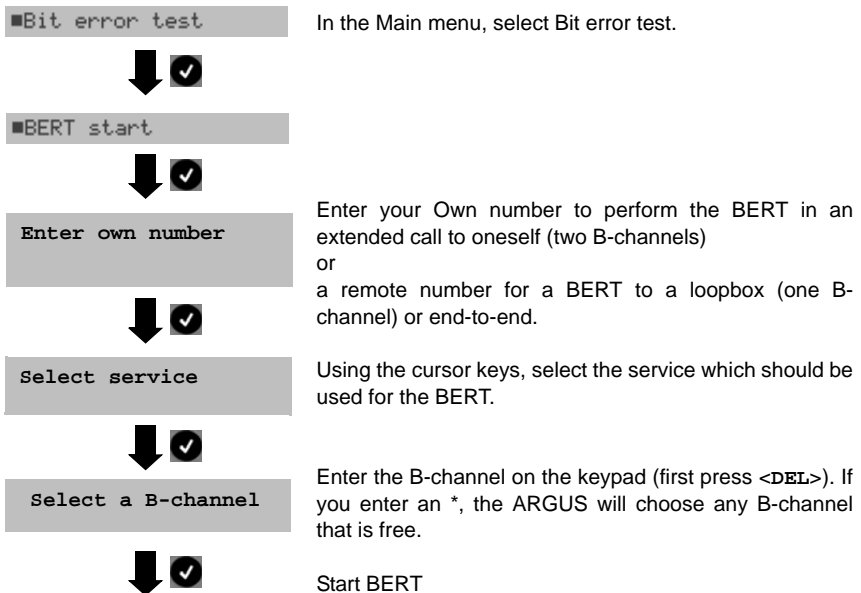
Independent of the received bit pattern, the remote tester uses the same algorithm to generate the bit-pattern that it sends back. Therefore, both directions are tested independently.

10.1.1 Start BERT

The following parameters are required for the BERT:

BERT time	default duration = 1 minute
Error level	If the bit error rate exceeds this limit, the ARGUS will display the test result NO. If the bit error rate is less than this limit, the ARGUS will display an OK (default setting = 10^{-06})
HRX value	Hypothetical reference connection in %, see the ITU-T G.821 (default setting = 15 %)
Bit pattern	Pattern which will be sent during the test (default setting = $2^{15}-1$)

The parameters can be individually changed to suit and then saved (see page 126).





After the ARGUS has setup the connection and synchronised the send and receive directions, it will display the bit pattern, the B-channel used (e.g. B1), the synchronicity of the bit pattern (synchronous or asynchronous), the sync time in h:min:sec (time in which the ARGUS can sync to the bit pattern), the LOS counter and the number of bit errors that have occurred.

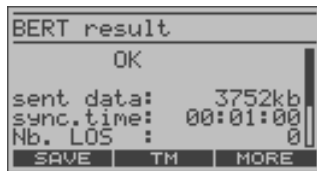
- < **ERROR** > The ARGUS will generate an artificial bit error, which can be used to test the reliability of the measurement (in particular for end-to-end tests).
- < **TM** > Call the Test Manager (see page 96)
- < **RESET** > Restart the bit error test: The test time and number of bit errors will be reset.



Stop the BERT



When a bit error is detected, this will be signaled by a brief alarm; in the event that the synchronisation is lost, a constant alarm will sound (see page 132 Alarm bell).

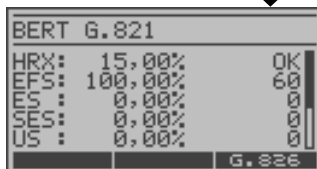


After the test time is over, the ARGUS will display the cause and the location which initiated the disconnect. If the test ran normally, the ARGUS will display "Active clearing" on this line.

The test results display:

- The evaluation of the results depends on the error level (OK)
- Transferred data (K= 1024* bits, k=1000*Bit),
- sync.time
- LOS counter
- abs.err: The number of bit errors
- rel. err: The bit error rate (e.g. $9.7E-07 = 9.7 \cdot 10^{-7} = 0.00000097$)

Display of other characteristic values (in accordance with ITU-T G.821)



All values are relative and given in percentages. The ARGUS evaluates whether the test results satisfy the limits specified in the CCITT G.821 with consideration of the reference connection HRX (displaying OK or NO).

Use the cursor keys to scroll through the results.

<G. 826> Display of the G.826 characteristic values



Return to the previous display

Characteristic values in accordance with ITU-T G.821 / G.826

HRX	Defines the hypothetical reference connection
EFS	Error Free Seconds: The number of seconds in which no error occurred.
ES821	Errored Seconds: The number of seconds in which one or more errors occurred.
SES821	Severely Errored Seconds: The number of seconds in which the bit error rate is $>10^{-3}$. In one second, 64,000 bits are transferred, thus $\text{BitError}=10^{-3}$ equates to 64 bit errors.
US	Unavailable Seconds: The number of all sequentially adjacent seconds (at least 9 sec) in which $\text{BER}>10^{-3}$.
AS	Available Seconds: The number of all sequentially adjacent seconds (at least 9 sec) in which $\text{BER}<10^{-3}$.
DM	Degraded Minutes: The number of minutes in which the bit error rate is $>10^{-6}$. In one minute, 3,840,000 bits are transferred, thus a $\text{BER} = 10^{-6}$ corresponds to 3.84 bit errors (3 errors = NO (no Degraded Minutes), 4 errors = OK (Degraded Minutes).
LOS	Loss of Synchronisation: Synchronization is lost at an error rate $>$ or $= 20\%$ within a second. The absolute number of synchronization losses will be shown.

10.1.1.1 BERT - saving

The ARGUS can store the results of several BERTs. The ARGUS saves the results together with the date, time and call number of the access under test (if this number is entered as the "own" number in the speed-dialling memory) under the next free record number (see page 101).

If all of the records are used, the ARGUS will return to the Autom. Test dialog and request permission to overwrite the oldest test results.

```
BERT result
OK
sent data: 3752kb
sync.time: 00:01:00
Nb. LOS : 0
SAVE  TM  MORE
```

Save the result?

<YES>

```
save as:
999999
DEL.  3b>AB
```



■BERT start

BERT - saving

Use the keypad to enter the name under which the ARGUS should save the results (Default: AMP_1, AMP_2.... or the call number of the access under test if the number has been entered into the speed-dialling memory (see page 133)).

When the right softkey is pressed it assumes a different meaning and thus influences the entries made from the keypad (letters or digits):

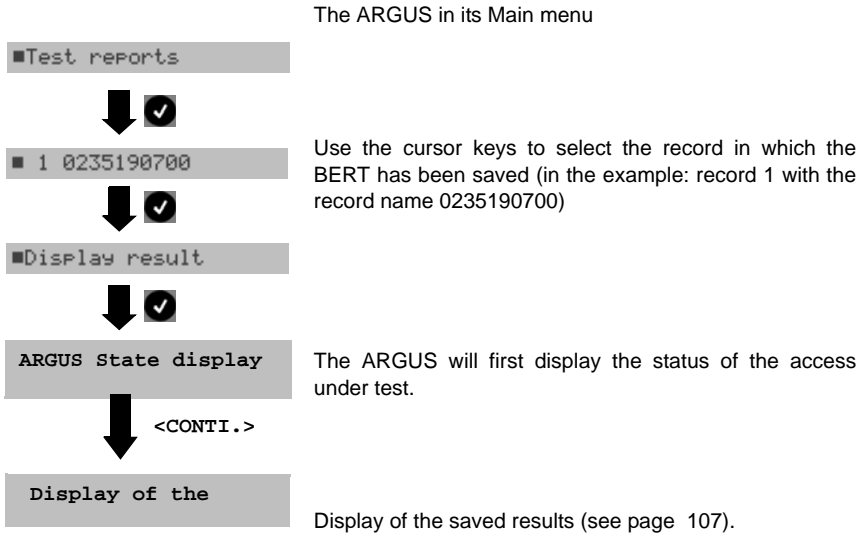
- < 12>ab > entry of the digits 0 to 9 plus * and #
- < ab>AB > entry of the lowercase characters and @, /,- and .
(e.g. to enter a "c" press the "2" on the keypad three times)
- < AB>12 > entry of the uppercase characters and @, /,- and .



Move the cursor

Delete the character before the cursor

10.1.1.2 Display the saved BERT results



10.1.2 BERT wait

In “BERT wait” mode, the ARGUS will wait for the BERT at the remote end which is necessary for an end-to-end test:

ARGUS in the Single tests menu

■Bit error test



■BERT wait



Activate “BERT wait”

```
BERT active
2^11      B1
synchron
sync.time: 00:00:34
LOS:      0
Error:     0
RESET    TM    ERROR
```

The ARGUS first waits for a call and then sets up the connection. During the connection, the received bit pattern will be evaluated and an additional independent bit pattern will be sent.

< **TM** > Opens the Test Manager (page 96)

The ARGUS displays that will appear are the same as those in Chapter 10.1.1 Start BERT .



Exit “BERT wait” mode

10.1.3 B-channel loop

"B-channel loop" mode is required in order to run a bit error test using a loopbox at the remote end as well as to test leased lines.

ARGUS - Single tests menu

■Bit error test



■B-channel loop



```
B-channel-LOOP
wait active
TM MENU
```

Activate the "B-channel LOOP"

The ARGUS will wait for a call. Any incoming call (regardless of the service) will be taken immediately. The ARGUS will switch a loop back in the B-channel that is specified by the exchange and then send the received bit pattern back to the caller/sender.

<MENU> The ARGUS will return to the Main menu.

(The "B-channel Loop" remains active. In the Main menu, if <TM> is pressed, the ARGUS will return to "B-channel Loop, wait active", see page 100). From this menu, you can start a second B-channel loop connection (this is also possible using < TM >).

< TM > Opens the Test Manager (page 96)



Exit "B-channel Loop" mode

```
B-channel-LOOP
235190700 B01
to :907070
TON:Unknown
NP :Unknown
TM MENU
```

If the ARGUS takes a call, the caller's number will be shown in the display (e.g. 235190700), along with the B-channel used (e.g. B01) and the number dialled (e.g. 907070).

Use the cursor keys to display additional information (e.g. UUS...) if available.

< TM > Opens the Test Manager (page 96)

<MENU> The ARGUS will return to the Main menu.



Disconnect B-channel loop
B-channel loop still active

10.2 Test the Supplementary Services

The ARGUS checks whether the access under test supports supplementary services in 1TR6 or DSS1 protocol.

10.2.1 Suppl. Services Test for the 1TR6 Protocol

The ARGUS in its Main menu

■Single tests



■SUPP.serv.test



Start the test

```
SUP.ser.req.1TR6
Barrier          +
Call diversion-1
Call diversion-2
Access CUG       -
Taxation         +
```

The test results are displayed automatically:

+ = suppl. service supported
- = suppl. service not supported

Use the cursor keys to scroll through the results



The ARGUS returns to the Single tests menu.

Sperre	Blocking enabled for outgoing calls
AWS1	Call forwarding type 1 enabled (continuous)
AWS2	Call forwarding type 2 enabled (case by case)
Anschluss GBG	Access belongs to a Closed Users Group
Geb.anzeige	Advice of charge
Rufnummern-Id	Set up call number identifier - against malicious calls

10.2.2 Suppl.service interrogation in DSS1

■SUPP.serv.test



Enter own number



Select service



Select a B-channel



Select test



```
SUPP. Serv. test
TP          -

```

In the Single tests menu, use the cursor keys to select Service test.

Use the keypad to enter the "Own number" or select if from the speed-dialing memory (the number of the access under test) (see "Saving Call Numbers" on page 133.). The ARGUS will test the availability of the supplementary service (in part by placing a call to itself).

Using the cursor keys, select the service which should be used for the supplementary services test.

Enter the B-channel on the keypad. By default, the channel last used will be suggested. If you enter an *, the ARGUS will choose any B-channel that is free.

Using the cursor keys, select which supplementary service should be verified to be supported by the access under test (e.g. the supplementary service TP).

Start the test

The ARGUS will display the results of the test once it is done:

+ = suppl. service supported
- = suppl. service not supported





to scroll through the results.



Close the results display.

The ARGUS will return to the previous display.

Test	Comments
TP	The ARGUS tests the TP (Terminal Portability) supplementary service by making a self call.
HOLD	The ARGUS tests the HOLD supplementary service by making a self call.

<p>CLIP (CLIP, CLIR, COLP, COLR)</p> 	<p>In this test, the ARGUS checks, one after the other, whether the 4 supplementary services CLIP, CLIR, COLP and COLR are supported. To do so, the ARGUS will setup as many as three calls to itself.</p> <p>CLIP: Will the calling subscriber's number be displayed at the called subscriber?</p> <p>t = CLIP temporarily available p = CLIP permanently available</p> <p>CLIR: Will the display of the calling subscriber's number at the called subscriber be suppressed or is it possible to temporarily suppress the display?</p> <p>If the ARGUS displays an *, it is not possible to determine the availability of the service, since no CLIP has been set up.</p> <p>t = CLIR temporarily available p = CLIR permanently available</p> <p>COLP: Will the call number of the subscriber who answered be displayed on the caller's phone?</p> <p>COLR: Will the display of the call number of the subscriber who answered be suppressed on the caller's phone or is it possible to temporarily suppress the display?</p> <p>If the ARGUS displays an *, it is not possible to determine the availability of the service, since no COLP has been set up.</p> <p>The suppl. services pairs CLIP and CLIR as well as COLP and COLR will be tested. If CLIR or COLR is set up permanently, it is not possible to make a clear assessment.</p>
<p>DDI</p>	<p>Can a caller directly dial in to an extension on the PBX access under test?</p>
<p>CF (CFU, CFB, CFNR)</p> 	<p>In this test, the ARGUS will check whether the 3 supplementary services CFU, CFB and CFNR are supported.</p> <p>CFU: Can this access immediately forward an incoming call?</p> <p>CFB: Can this access forward an incoming call when it is busy; in other words does it support Call Forwarding Busy?</p> <p>CFNR: Can this access forward an incoming call when it is not answered?</p> <p>The CF test attempts to setup a call diversion to the call number that is in the memory location for "remote call number 1" (see "Saving Call Numbers" on page 133.). The CF test cannot be performed, if this location does not contain a valid call number to which it is possible to divert a call.</p>
<p>CW</p>	<p>Does the access under test support call waiting?</p>

CCBS CCBS-T	/ Will the access under test automatically recall a remote subscriber, if the number called was busy?
CCNR CCNR-T	/ Will the access under test automatically recall a remote subscriber if the call was not answered?
MCID	Does the access tested allow identification of malicious callers (call tracing)?
3pty	Does the access under test support a three-party conference call? For this test, you need the assistance of a remote subscriber, whose call number must be entered.
ECT	Is an explicit call transfer supported by the access under test? For this test, you need the assistance of a remote subscriber, whose call number must be entered.
AOC	The ARGUS checks whether the charges can be sent to the access under test. The test uses a call to oneself to check both AOC-D (AOC during a call) and AOC-E (AOC at the end of a call).
SUB	A call is made to oneself and answered to check the transfer of the sub-address in both directions. Are sub-addresses supported on the access under test?
UUS	Does the access under test support the transfer of user data?
CUG	The ARGUS then uses a self call to check whether the access under test belongs to a closed user group.
CD	An incoming call will be diverted immediately. This form of call diversion differs from the others in that it is invoked on a call-by-call basis, and is not preconfigured to a specific destination.

10.2.3 Supplementary Services Tests – Error messages

If an error occurs during the Supplementary Services Tests or if it is not possible to setup a call, the ARGUS will display the corresponding error code (e.g. 28).

Example: The error code 28 belongs to the error class "wrong or invalid number".

In the table below, you will find that this is an error from the network and that it reports that the call number was incomplete or in the wrong call number format (see "CAUSE-Messages – DSS1 Protocol" on page 141.).

Distributing the error codes into error classes:

Error class	Description	Cause (from network)		Cause ARGUS internal
		1 TR6	DSS1	
A	no or another access	—	—	201,204,205, 210,220
B	wrong or invalid number	53, 56	1,2,3,18,21,22, 28,88	152,161,162, 199
C	One or more B-channels busy	10,33,59	17,34,47	—
D	wrong service	3	49,57,58,63 65,70,79	—

"ARGUS Error Messages" on page 145, "CAUSE-Messages – DSS1 Protocol" on page 141 und "CAUSE-Messages – 1TR6 Protocol" on page 143.

10.3 Service test

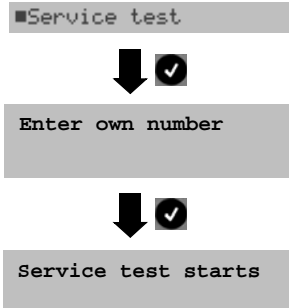
The ARGUS checks, which of the following services are supported by the access under test:

Service	Name displayed on the ARGUS
Language	Language
Unrestricted Digital Information	UDI 64kBit
3.1 kHz Audio	3.1kHz audio
7 kHz Audio	7 kHz audio
Unrestricted Digital Information with tones / display	UDI-TA
Telephony	Telephony ISDN
Facsimile Group 2/3	Fax G3
Facsimile Group 4 Class 1	Fax G4
Teletex service basis and mixed mode and facsimile service Group 4 Classes II and III	Mixed Mode
Teletex Service basis mode	Teletex
International inter working for Videotex	Videotex
Telex	Telex
OSI application according to X.200	OSI
7 kHz Telephony	Telephony 7kHz
Video telephony, first connection	Video telephony 1
Video telephony, second connection	Video telephony 2
Three user-specific services (see, page 124)	User-specified 1 to 3

The test runs automatically.

For each service, the ARGUS will place a call to itself (to the access under test). However, the call will not be answered so no charges will be incurred.

ARGUS in the Single tests menu



Enter the number of the access under test



There are PBXs that use separate call numbers for incoming and outgoing calls. In this case, for the Service tests, you can enter a “remote” call number that does not match the “own” number that is stored in the ARGUS.

If the Service test should extend outside of the local exchange, it is possible to perform the Service test in an end-to-end mode.

In this case, you must enter the remote call number for a second terminal device. The ARGUS will then automatically check whether the remote terminal can accept the call under the various services – in other words, whether it is “compatible” with these services.

In the test results, the second part (second +, - or *) refers to the answer from the remote exchange.

Test results:



The ARGUS will display the results of the test once it is done.

Use the cursor keys to scroll through the results.

The ARGUS makes a distinction between outgoing calls (the first +, - or *) and incoming calls (the second +, - or *).

+ = Service supported

- = Service not supported

* A definite statement cannot be given, see the adjacent error code for the reason.



to scroll through the results.



Close the results display.

The ARGUS will return to the previous display.

Interpreting the test results:

Display	Explanation
+ +	The self call functions OK or the remote end can take the call for this service
+ -	The call was sent successfully, however, it was rejected at the remote end due to a lack of authorization. (Error class D in a B-channel message e.g. in a SETUP_ACK or CALL_SENT)
-	An outgoing call with this service is not possible (Error class D without a B-channel message)
+ *	The call was sent successfully, the call back or call to the remote end failed (e.g., remote end busy or no B-channel available for the call back).
*	Wrong number, no B-channel available or other error (Error class B, C or E without a B-channel message)

If the outgoing call is not successful, it is not possible to make a statement about an incoming call. Therefore, you will never see “- +” or “- *” on the display.

An example:


Service check	
Telephony ISDN	++
Fax G3	++*63
Fax G4	+-
Mixed Mode	+-
Teletex	++

For outgoing, the Fax G3 service is OK. No statement is possible about incoming.

The error code 63 gives the coded cause of the error (see the table in the Appendix).

In this case, it is recommended that you have someone place a call to the access under test using this service.

The services Fax G4 and Mixed Mode are supported for outgoing calls.

The Teletex service is supported in both directions.

If an error of error class A occurs (see “Supplementary Services Tests – Error messages” on page 70.) the Service test will be aborted. An error of any other error class will coded in decimal (in the example above 63), assigned to the respective service and then displayed.

10.4 X.31 Test

The ARGUS will either perform a "Manual X.31 Test" or an "Automatic X.31 Test":

In the case of an automatic test, the ARGUS will first set up the D-channel connection and then begin setting up the X.31 connection. Afterwards, the ARGUS will automatically clear the connection and display the results.

In the case of a manual test, the ARGUS will set up a D-channel connection and an X.31 connection. The duration of this connection is determined by the user (or the opposing end). For the duration of the connection, the ARGUS will repeatedly send a predefined data packet. The ARGUS will count all of the data packets sent and received and will display (where possible) the contents of the data packets received.

10.4.1 X.31 Automatic, D-channel test

The "X.31 Automatic, D-channel" test consists of two steps:

First step:

The ARGUS tests whether it is possible to access the X.25 service via the D-channel on the BRI access under test. The ARGUS sequentially checks all the TEIs from 0 to 63. All the TEIs with which the X.31 service is possible on Layer 2 will be displayed.

Second step:

For each TEI with which X.31 is possible on Layer 2, a CALL_REQ packet will be sent and then the ARGUS will wait for an answer. Beforehand, the ARGUS will request the entry of the X.25 access number, which will be saved in speed-dialling memory under X.31 test number (see "Saving Call Numbers" on page 133). With the entry of the X.25 access number, you can - if you wish - select a logical channel (LCN) other than the default.

■X.31 test



■Automatic



■D channel



```

X.31-Test
current TEI:
42
-----
Previous TEI:
41 NOK
    
```

In the Single tests menu, select the X.31 test.

Use the cursor keys to select Automatic.

Use the cursor keys to select D-channel.

Start the test

The test can take up to 4 minutes (a rotating bar will be displayed). The ARGUS will display the currently tested TEI, the previously tested TEI and the results:

OK = X.31 is available for this TEI

NOK = X.31 is not available for this TEI

```

X.31-Test
TEI      : 02
Layer 2: +
Layer 3: - 13 67
    
```

After the test is completed, the ARGUS will show whether the X.31 service is available for Layer 3 for the TEIs found in Step 1.

Use the cursor keys to scroll through the results.

Test results:

TEI:02 The first valid TEI value is 02.

Layer 2: + test step was successful

- 1. test step was unsuccessful

Layer 3: + 2. test step was successful

- 2. test step was unsuccessful.

In this case, the ARGUS will display the relevant X.31 cause for the failure (in the example above, 13) and the associated diagnostic code (in the example, 67) if available (see page 145).

If the X.31 service is not supported, the ARGUS will report "X.31 (D) n. impl."

10.4.2 Manual X.31, D-channel test

In this test variant, the ARGUS first requests a TEI, LCN and an X.31 number (The ARGUS uses the values set in the configuration menu as default values (see page 130)). If a "***" is entered for the TEI, the ARGUS will automatically determine a TEI.

■X.31 test



■Manual



■D channel



TEI is displayed



LCN is displayed



Display or enter the X.31 number



```
X.31 (D) test
X.31 (D) Connection
LCN: 1      TEI: 2
1234567890
PS DCE [byte]:
Tx: 128 - Rx:128 -
STAT. DATA
```



Save X.31 (D) test?

ARGUS in the Single tests menu

The ARGUS displays the stored TEI (see page 130). You can edit the TEI from the keypad; If you enter **, the ARGUS will determine a TEI automatically.
 Delete the TEI

The ARGUS displays the stored LCN (see page 130). It is possible to edit the LCN from the keypad.

The saved X.31 number (speed-dialing memory) is displayed. It can be edited from the keypad.

Set up a X.31 connection

The ARGUS will display the LCN, TEI and X.31 number and the negotiated connection parameters.

<DATA> Sends a predefined data packet

<STAT.> display L1 statistics

Use < L2 > or < L3 > to scroll to the L2 or L3 statistics.

The connection will be maintained until the user or the opposing end clears it. When the X.31 connection is cleared, the ARGUS will automatically clear the D-channel connection.

<YES> The ARGUS saves the results (see page 101).

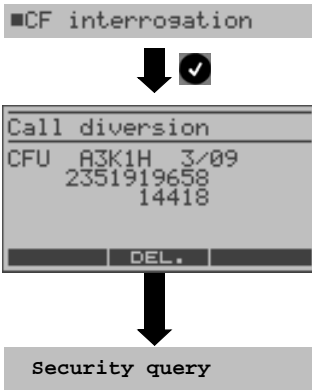
10.5 CF Interrogation

The ARGUS will check whether a call diversion has been setup in the exchange for the access under test (BRI or U-interface).

The ARGUS will show the type of diversion (CFU, CFNR or CFB) and the call diversion's service. The display is limited to a maximum of 10 call diversions for all of the MSNs. The ARGUS will count any additionally set up call diversions.

Any call diversion set up in the exchange can be cleared with the ARGUS.

ARGUS in the Single tests menu



Start the CF interrogation;
The test can take several seconds.

The ARGUS displays the type (e.g. CFU) and service (e.g. A3K1H) of the call diversion, which in this example is the third of a total of nine found (3/09). The number 2351919658 is diverted to 14418.

Delete a call diversion

Security query

- <YES> Clear the displayed call diversion in the exchange
If the call diversion cannot be cleared, the ARGUS will report: "Call diversion not changeable!"
- <ALL> Delete all call diversions.
- <CONTI.> The ARGUS returns to the Single tests menu.



Some PBXs or exchanges do not permit the use of the mechanism used (by the ARGUS) for the interrogation of the call diversions for all MSNs or they return a negative acknowledgement of the interrogation of call diversions, implying that no call diversions have been set up.

In the event of a negative acknowledgement, the ARGUS will, therefore, request that the own MSN be entered.

The call diversion interrogation will be repeated MSN-specific.

Naturally, in this case, the results of the interrogation of the call diversion only apply for the entered MSN and not for the entire access.

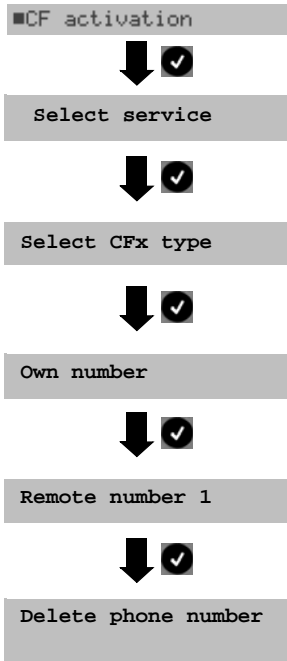
Abbreviations used for the services and service groups on the display:

Basic Service	Abbreviation
All services	All
Voice (speech)	Lang
Unrestricted digital information	UDI
Audio 3.1 kHz	A3k1H
Audio 7 kHz	A7khz
Telephony 3.1 kHz	Tel31
Teletext	TTX
Fax Group 4	FaxG4
Video syntax based	ViSyB
Video Telephony	ViTel
Telefax Groups 2/3	FaxG3
Telephony 7 kHz	Tel7
UDI 64 kBit	UDI
Unknown Basic Service	Unkno

10.6 CF - Activation

Using the ARGUS, call diversions can be set up in the exchange (BRI or U-Interface).

ARGUS in the Single tests menu



Using the cursor keys, select the **service of the call diversion**.

Using the cursor keys, select the type of call diversion (e.g. CFU).

Under "Own number", enter the number which should be diverted.

Delete the digit before the cursor

Enter the number to which calls should be diverted.

Set up the call diversion

<CONTI.>

The ARGUS returns to the Single tests menu.

10.7 CF - Delete

Using the ARGUS, call diversions can be deleted/cleared in the exchange (BRI or U-Interface).

ARGUS in the Single tests menu

■CF delete



Select service

Using the cursor keys, select the **service of the call diversion**.



Select CFx type

Using the cursor keys, select the type of call diversion (e.g. CFU).



Own number

Under "Own number", enter the number which should no longer be diverted.

 Delete the digit before the cursor



Call number deleted

Delete a call diversion

<CONTI.> The ARGUS returns to the Single tests menu.

10.8 MSN Interrogation (only on a BRI with DSS1)

On a P-MP access using the DSS1 protocol, the ARGUS will determine the MSNs of the access under test. It will display a maximum of ten call numbers. Depending on the Type of Number (TON), the ARGUS will display the call numbers in different versions:

- only the MSN (without area code)
- MSN with national area code without the leading "0"
- MSN with country code without the leading "00"
- complete call number



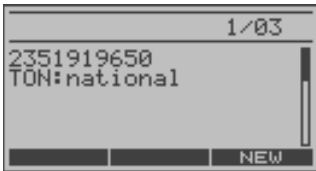
In order to interrogate the MSNs, the access under test must support the supplementary service "Call Forwarding (CF)".

ARGUS in the Single tests menu

■ MSN interrogation



Start the MSN interrogation



In this example, the ARGUS displays the first MSN (2351919658) of a total of three found (1/03).

Use the cursor keys to scroll through the results.

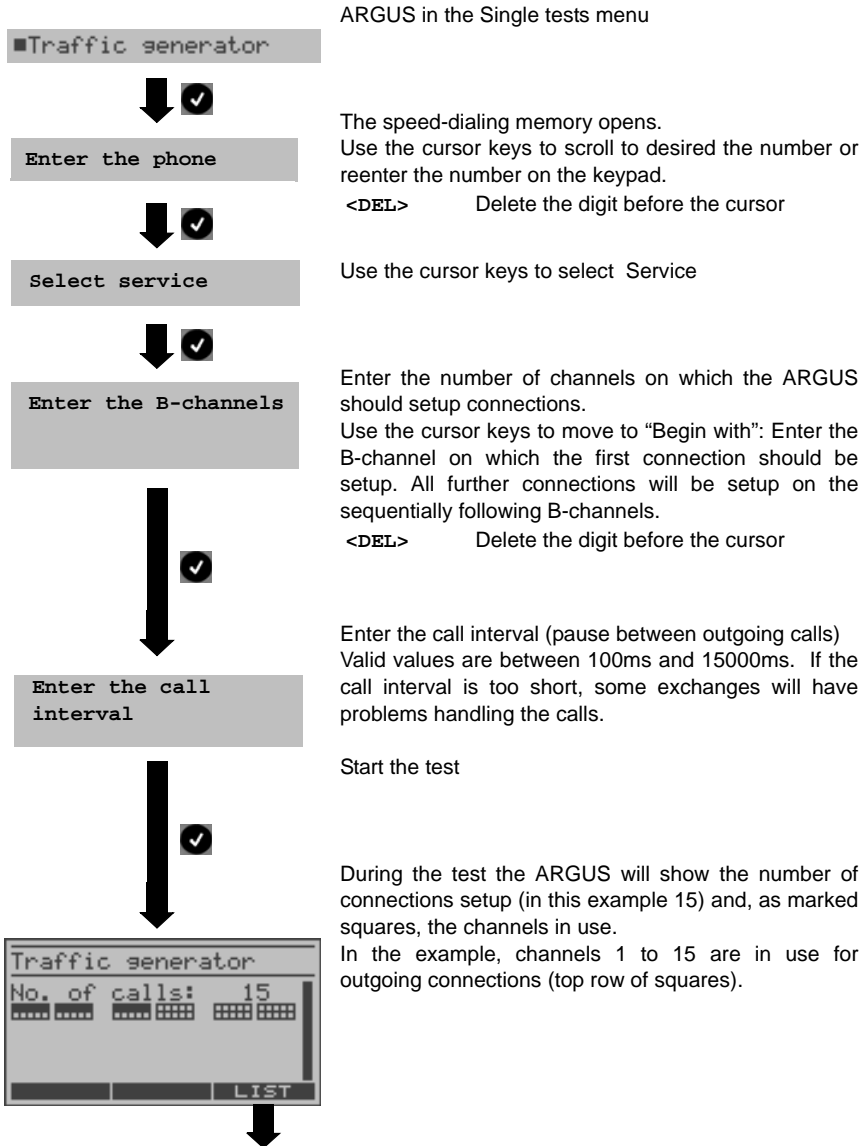
<NEW> Repeat the MSN interrogation



Due to differences in the protocol, some exchanges do not support MSN interrogation. In this case, the ARGUS will report: MSN interrogation not possible!

10.9 Traffic generator (only on a PRI access)

The ARGUS will automatically setup as many as 30 connections and will display which B-channels on the PRI access are available for incoming and outgoing calls.



```

Traffic generator
B01: -> CON
B02: -> CON
B03: -> ALERT
B04: -> ALERT
B05: -> ALERT
GRAPH
    
```

Display of the status of the connections currently setup on the individual B-channels
Use the cursor keys to scroll through the results.



The test must be terminated manually.

Stop test

```

Traffic generator
No. of calls: 15
.....
LIST
    
```

```

Traffic generator
B01: -> DIS 0
B02: -> DIS 0
B03: -> DIS 0
B04: -> DIS 0
B05: -> DIS 0
GRAPH
    
```

After the test is over, the ARGUS will display the causes for clearing the connections on the individual B-channels (see Appendices B and C page 141 / page 143).

10.10 Time measurements

The ARGUS measures three different times:

- Connection set up time
- Propagation time of the data (B-channel delay)
- Transit time differential (interchannel delay) of the data in two B-channels.

Time measurements on a BRI or U-Interface access are only possible in TE mode.

10.10.1 Connection set up time

The ARGUS places an outgoing call and measures the time between sending the SETUP and receiving the ALERT or CONN. The ARGUS disconnects automatically as soon as the measurement is completed.

ARGUS in the Single tests menu

■Time measuring



■Conn.setup time



Dial the number



Select service



B-channel select



Conn. setup time
1,544 s ALERT

Enter - or select from the speed-dialing memory - the call number for the outgoing call.

Enter the B-channel on the keypad.

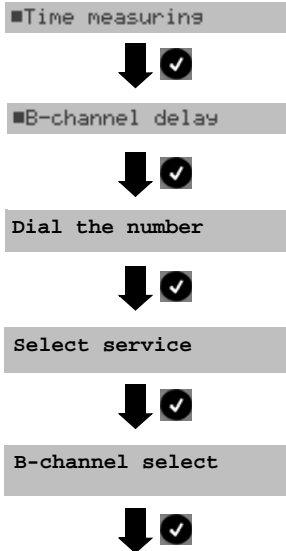
Perform measurement

The ARGUS will display the connection setup time in seconds and the received L3 messages (end of connection setup). If the ARGUS cannot perform the measurement (e.g. because the call number entered was wrong or no B-channel was free) the corresponding cause will be displayed.

10.10.2 Time measurement: B-channel delay

The ARGUS places a call to itself (self call) or to a remote loopbox and measures the propagation delay for the data in the selected B-channel. The measurement (continuous measurement) must be terminated manually.

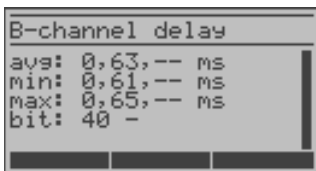
ARGUS in the Single tests menu



Enter - or select from the speed-dialing memory - the call number for the outgoing call.


Enter the B-channel on the keypad.

Perform measurement



The ARGUS displays the average (avg), the shortest (min) and the longest (max) B-channel delay as well as the average B-channel delay in bits (in multiples of the time required to send a bit at 64 kBit/s). (The time for sending 1 bit at 64 kBit/s = approx. 15.26 μ s.)

The measurement will be repeated in cycles. (continuous measurement)

 : to terminate the measurement and display the results of the last measurement

If the measurement cannot be performed (e.g. because the call number entered was wrong or no B-channel was free) the ARGUS will display the corresponding cause.

When it is connected to a loopbox, if the ARGUS does not receive the data back within 13 seconds, it will display the message "No LOOP".

10.10.3 Time measurement: Interchannel delay

The ARGUS establishes two separate connections to a remote loopbox. The loopbox sends the respective B-channel data back on the same channel. The ARGUS measures the propagation delay for the data on each of the B-channels and determines the difference between the two propagation delays (interchannel delay). The measurement (continuous measurement) must be terminated manually.

ARGUS in the Single tests menu

■Time measuring



■Interchannel delay



Dial the number



Select service



Enter - or select from the speed-dialing memory - the call number of the loopbox

Perform measurement

```
Interchan.delay
avg: 0,00,-- MS
min: 0,00,-- MS
max: 0,00,-- MS
bit: 0 -
```

The ARGUS displays the average (avg), the shortest (min) and the longest (max) interchannel delay in msec. as well as the average interchannel delay in bits (multiples of the time required to send a bit at 64 kBit/s) - it takes 15.26 μ sec to send a bit at 64 kBit/s). The measurement will be repeated in cycles. (continuous measurement)



: to terminate the measurement and display the results of the last measurement

If the measurement cannot be performed (e.g. because the call number entered was wrong or no B-channel was free) the ARGUS will display the corresponding cause. When it is connected to a loopbox, if the ARGUS does not receive the data back within 13 seconds, it will display the message "No LOOP".

11 ISDN connection

The ARGUS can setup a connection for the following services:

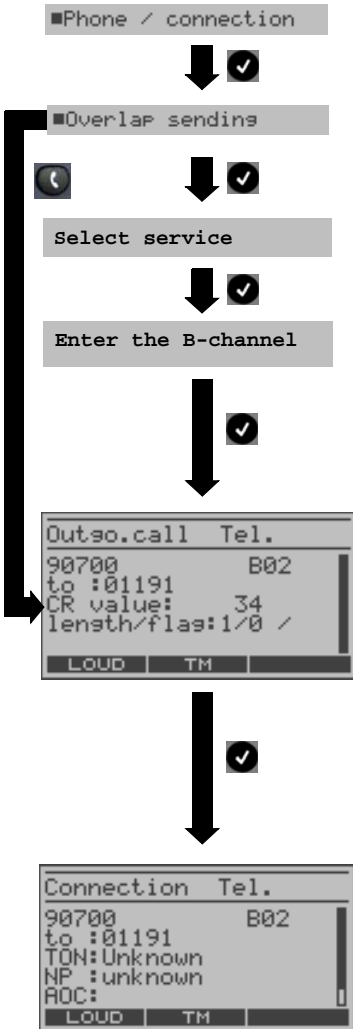
Service	Name in the ARGUS display / abbreviation
Language	Language / Lang
Unrestricted digital information	UDI 64kBit / UDI 64
3.1 kHz Audio	3.1 kHz audio / 3.1k
7 kHz Audio	7 kHz audio / 7 kHz
Unrestricted Digital Information with tones / display	UDI-TA / UDI TA
Telephony	Telephony ISDN / Tel.
Facsimile Group 2/3	Fax G3 / FaxG3
Facsimile Group 4 Class 1	Fax G4 / FaxG4
Teletex service basis and mixed mode and facsimile service Group 4 Classes II and III	Mixed Mode / Mixed
Teletex Service basis mode	Telex / Ttx64
International inter working for Videotex	Videotex / VTX
Telex	Telex / Telex
OSI application according to X.200	OSI / OSI
7 kHz Telephony	Telephony 7kHz / Tel7k
Video telephony, first connection	Video telephony 1 / Vid.1
Video telephony, second connection	Video telephony 2 / Vid.2
Additional three user-specific services (see "Services" on page 124.)	

The integrated handset can be used as a phone during a telephone connection.

When an ISDN connection is setup, pressing the number keys (0-9) or the * or # will generate and send the corresponding DTMF tones.

11.1 Overlap sending (outgoing call)

In overlap sending, the digits entered for the call number are sent individually.



ARGUS in the Single tests menu



The ARGUS will open the Outgo.call Tel. display

Using the cursor keys select the service that should be used for the connection.

Enter the B-channel via the keypad (as the default setting, the ARGUS will suggest the last B-channel used). When entering a new B-channel, first press the DEL softkey. If you enter an *, the ARGUS will choose any B-channel that is free. The ARGUS will show whether the B-channel is available.

Setup the connection

Enter the number on the keypad.

The ARGUS displays the service (e.g. Tel.), the own number (90700), the B-channel (B02) and the number called (01191), the call reference (CR value) as well as its length and flag.

<TM> Starts the Test Manager (page 96)



Disconnect

or



The connection is set up using B-channel 2.



View additional information (if available)

- Subaddress of the caller
- Destination number
- User-to-User Information
- Display Information
- Type of number (TON)

<LOUD> switch to LOUD

<TM> Starts the Test Manager (page 96)



or



Disconnect
The ARGUS displays the cause of the disconnect.
(see page 93 Clearing Down an ISDN Connection)

- Advice of charges:

If the charges are not given in units, rather directly as currency, the ARGUS will display the current charges in currency. If, in DSS1, the call charges are not provided in accordance with the ETS 300 182 standard, rather in the form of the information element DISPLAY (DSP), the ARGUS will display the DISPLAY message's character string.



Note regarding the entry of the call number

Separate the extension from the access number with a # (e.g. 02351 / 9070-20 is entered on the ARGUS as: 023519070 #20). For an outgoing call, the ARGUS uses the entire call number (without #) as the number called (CDPN or DAD) and, for the calling number, only the extension (DSS1-CGPN or 1TR6-OAD).


A “#” at the beginning of a call number is treated as a valid character. A “#” at the end of the own call number instructs the ARGUS to not send the caller's number for outgoing calls (CGPN or OAD).



Simplified overlap sending using the telephone key

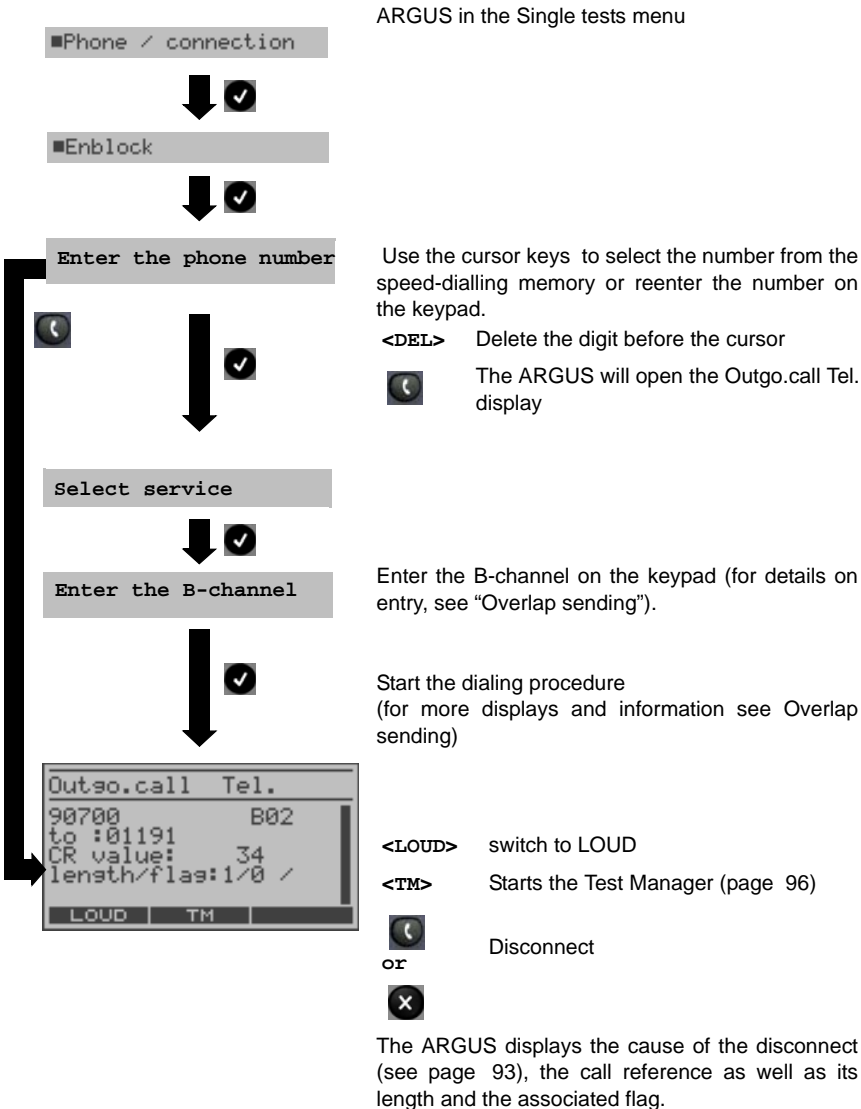


The ARGUS will open the Connection/Overlap window directly regardless of the currently open menu.

If you press the  key again, you will hear the dial tone. Once you enter a call number, the connection will be setup.

11.2 En-bloc sending (outgoing call)

In en-bloc sending, the ARGUS sends the entire dialing information in one block. The number is dialed from the call number memory (page 133).



11.3 Redial (outgoing call)

The ARGUS will set up a call using the last number dialed.

■Phone / connection



■Redialing



Select service



Enter the B-channel



```
Outgo.call Tel.
90700      B02
to :01191
CR value:  34
length/flag:1/0 /
LOUD  TM
```

ARGUS in the Single tests menu

Enter the B-channel via the keypad (as the default setting, the ARGUS will suggest the last B-channel used). When entering a new B-channel, first press the DEL softkey. If you enter an *, the ARGUS will choose any B-channel that is free.

The ARGUS will show whether the B-channel is available.

The dialing procedure will begin using the number which was dialed last.

For more displays and information, see Overlap sending.

<LOUD> switch to LOUD

<TM> Starts the Test Manager (page 96)



or

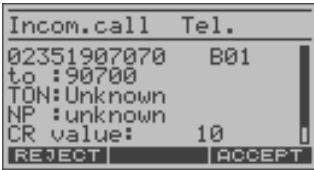


Disconnect

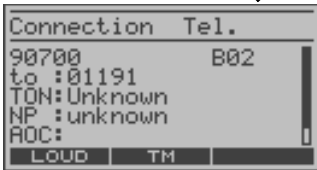
11.4 Incoming Call

An incoming call can be taken at any time even when a test (e.g. BERT) is in process (see page 97).

The ARGUS will signal an incoming call with an audible tone and a message on the display. On a P-MP access, you can use the Call acceptance (see "Call Acceptance" on page 124.) function to configure the ARGUS to only signal incoming calls which are addressed to the MSN that corresponds to your own call number. This function can only be used when your own call number has been entered into the ARGUS's speed-dialing memory (see page 133) and the incoming call has a destination MSN.



Reject call



The ARGUS displays the service (Tel.), the number of the caller (02351907070), the B-channel used (B01) and the number called (90700).

The ARGUS will display the complete destination number (DDI), if the Alerting mode is set to manual (see page 121).

Use the cursor keys. View additional information (if available).

To take the call.

Press the the cursor keys to view more information.

<TM>

Start the Test Manager (see page 96)



Clear the connection

or

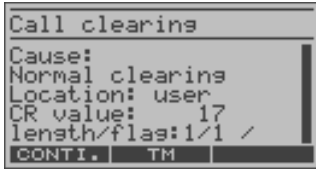


The ARGUS displays the cause of the disconnect (see page 93).

Charge information in NT mode:

In NT mode, the ARGUS will – for incoming calls – send advice of charges in accordance with DSS1 as units and as currency (in Euro).

11.5 Clearing Down an ISDN Connection



Clear the connection

or



<TM>

Open the Test Manager

The ARGUS will display the cause (see the table below) of the disconnect (e.g. Normal clearing) and the location where the cause occurred (e.g. subscriber).

Use the cursor keys to view additional information

(e.g. charges, if available).

The following causes are shown in clear text:

Cause	Display	Explanation
255	Active clearing	Clearing User actively initiated the disconnection
Length 0	Normal clearing	Cause element with Length 0 is mostly used by 1TR6
01	unalloc. number	Signals "No access under this call number"
16	Norm. clearing	Normal disconnect
17	User busy	The number called is busy
18	No user respond	No answer from the number called
19	Call.time XX	Call time too long
21	Call reject	The call is actively rejected
28	Wrong number	Wrong call number format or call number is incomplete
31	Norm. clearing	Unspecified "normal class" (Dummy)
34	No B-chan.avail.	No circuit / B-channel available
44	Req.chan.unavail	Requested B-channel not available
50	Req.fac.not subs	Requested supplementary service (facility) not subscribed
57	BC not authoriz.	Requested bearer capability is not enabled
63	srv./opt.n.avail	Unspecified for "Service not available" or "Option not available"
69	Req.fac.not impl.	Requested facility is not supported
88	Incompat. Objectives	Incompatible destination
102	Timer expired	Error handling routine started due to time-out
111	Protocol error	Unspecified for "protocol error class"
127	Interworking err	Unspecified for "interworking class"

Other causes are not shown in clear text, rather as decimal codes (see Appendix B and C and page 141 and page 143).

11.6 Testing Features with the Keypad

This feature is only relevant on a BRI access.

Some network operators do not support the standard DSS1 features, rather they expect the user to control the network via so-called keypad command sequences.

In these cases, the desired facility is usually activated by entering a series of characters and then sending these characters within a DSS1-specific protocol element. These so-called Keypad-Elements are imbedded in a SETUP message. Each step is acknowledged either acoustically (handset) or via special protocol elements (cause). These causes are displayed by the ARGUS.

■Phone / connection



■Keypad dial



Keypad info 01/03
Q**67
EDIT



Select service



Enter the B-channel



out.call

In the Single tests menu, select "Connection".

Select "Keypad dial"



Select a Keypad Info entry

<EDIT > Select a Keypad Info entry to be edited.
Afterwards, use the keypad to enter the Keypad Info (see page 125).

Using the cursor keys select the service that should be used for the connection.

Enter the B-channel to be used for the connection via the keypad (by default, the last B-channel used will be suggested). When entering a new B-channel, first press . If you enter an *, the ARGUS will choose any B-channel that is free. The ARGUS will show whether the B-channel is available.

Start the dialing procedure
(for more displays and information see Overlap sending page 88)

12 Test Manager

The ARGUS can simultaneously start several tests or “connections” fully independently of each other on the ISDN access under test. As an example, a BERT can be run at the same time that you make a phone call. The individual tests or “connections” use resources.

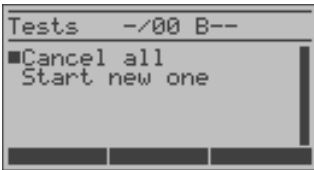
All of the tests that have been started will be administered by the Test Manager. Using the Test Manager you can start new tests, switch between tests running in parallel or terminate all of the tests that are currently running.

The ARGUS in its Main menu

■Test manager



Open the Test Manager



<TM>

or



Opens the Test Manager directly, if the ARGUS is in the Single tests menu or has a connection for a call or is running a test.

12.1 Starting Several Tests to Run Simultaneously

Starting a new test or connection during an existing connection

```

Connection Tel.
90700      B02
to :01191
TON:Unknown
NP :unknown
AOC:
LOUD  TM
  
```

An example:

There is a connection on B-channel 2.

During this connection, the Test Manager is opened (or started by pressing the **6** -key. The ARGUS will display the number of existing connections (-/01).

Select "Start new one"

```

■Start new one
  
```

Mark "Single tests"

```

■Single tests
  
```

Select the desired test (e.g. bit error test).

Start test (still connected)

For information on running a BERT, see page 59

```

■Bit error test
  
```

The ARGUS opens to the Test Manager.

Mark "Outgo.connect."

An example of

```

■Outgoing connection
  
```

```

Tests  1/03 B02
  
```

The connection
was the first
started

There are currently two
active connections or
tests

The connection
uses B-channel 2

The ARGUS will open
the Connection display.

If a test (or connection) is cancelled/cleared, the ARGUS will return to the Test Manager if there is another test (or connection) running in the background.



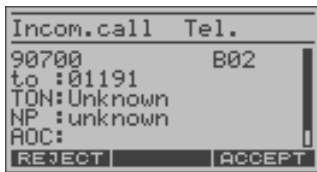
Some tests use so many resources that they cannot be run in every combination with other tests. In this case, the ARGUS will display the message “Test not possible at this time”.

Test/ Connection	Number of times that this test/connection can be started at the same time	It is possible to change to another test
Incoming call	2 (30 on a PRI)	Yes
Outgoing call	2 (30 on a PRI)	Yes
BERT	2	Yes
LOOP	2	Yes
Service tests	1	No
Suppl.serv.test	1	No
Time measurement	1	No
X.31 Test	1	No
CF Interrogation	1	No
Auto. Test	1 When the Auto. Test is running all of the resources are in use and no other tests or connections are possible	No
BRI level	1	No

Accepting an incoming call/connection when a test is running.

The ARGUS signals an incoming call both audibly and on the display (see page 87 ISDN connection). The incoming call can be accepted without influencing the currently running test. If either the B-channel loop or BERT wait function is active, the call will be accepted automatically.

The manner that multiple connections are handled is illustrated in the following example of "Accepting an incoming call during a BERT", but it is identical for all other tests.



While running a BERT, the ARGUS displays information about an incoming call.

<REJECT> Reject the incoming call.
The ARGUS returns to the BERT.

To take the call.



The BERT will continue in the background.

or 6



Select "BERT outgoing".



The ARGUS jumps to the BERT.

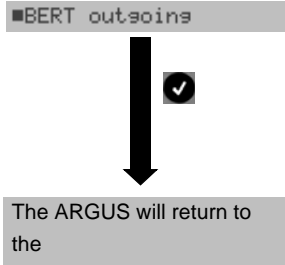
The connection is still active in the background, the handset is still switched to the connection.



If available, the internal handset will be assigned to the currently started (voice) connection. The assignment of the handset to a given connection is also retained in the background.

12.2 Switching Between Tests

Example:



Start the Test Manager

Using the cursor keys, select the Test (Connection) that you wish to switch to.



The ARGUS will return to the point from which the Test Manager was called (e.g. to a test running in parallel). If no other test is running, the ARGUS will return to the Main menu.

12.3 Cancel All

Open the Test Manager.



Mark "End all".

The ARGUS will cancel all of the currently running tests and/or current connections and then return to the Main menu.

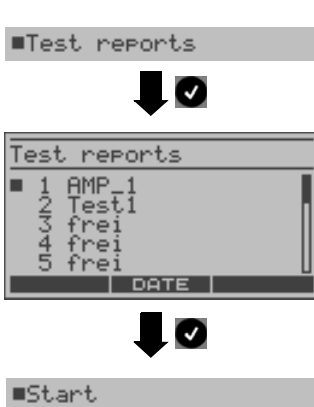
13 Test Results

The ARGUS displays the saved test results. Using the Intec software, WINplus or WINanalyse, the test results can also be saved on a PC. WINplus or WINanalyse can then be used to generate a comprehensive measurement report from these results.

The ARGUS saves the test results together with the date and time (from the internal clock of the ARGUS). Additionally, settings such as your own plus a remote call number will also be saved. The results are not lost when the ARGUS is switched off.

The ARGUS saves the test results in sequentially numbered (1, 2, 3...) records.

Each item in the Test reports menu refers to a record. Therefore, the first step will open a dialog in which you must select the desired data record.



The ARGUS in its Main menu

Use the cursor keys to select the record (saved test results). The ARGUS will display for each record number the associated name or the corresponding date and time. Empty records are labeled as "free".

<DATE> Display the date and time

<NAME> Display the record names

Entering a record name:



The ARGUS will save the test results in the first free record. This record can be assigned a name (default: AMP_1, AMP_2, AMP_3 or the call number of the access under test if the number has been entered into the speed-dialling memory, see page 133). If all of the records have been written, you must manually select a memory location (record).

The record name is entered using the numeric keypad. When the right softkey is pressed it assumes a different meaning and thus influences the entries made from the keypad (letters or digits):

< 12>**ab** > entry of the digits 0 to 9 plus * and #
 < **ab**>**AB** > entry of the lowercase characters and @, /,- and . (e.g. to enter a "c" press the "2" on the keypad three times)

< **AB**>**12** > entry of the uppercase characters @, /,-, .



to move the cursor right or left.

<**DEL**> Delete the character before the cursor

13.1 Start the automatic test

In this case, the ARGUS executes a test sequence automatically. The required parameters (e.g. measurement time and error level for the BERT see page 126) should be checked before the automatic test series is begun.

Using the intec software, WINplus or WINanalyse, the test results can also be saved on a PC, where they can be presented in a comprehensive measurement report and printed.

The ARGUS automatically performs the following sequence of single tests:

On a BRI or U-interface access (ARGUS in TE Mode)

- Status
- Level measuring
- Service tests
- BERT in an extended call to oneself
- Supplementary Services Test (Suppl.serv.test)
- CF Interrogation (Call Diversions)
- MSN Interrogation
- X.31 test

On a PRI access (ARGUS in TE Mode)

- Status
- Service tests
- BERT in an extended call to oneself
- Supplementary Services Test (Suppl.serv.test)
- CF Interrogation (Call Diversions)
- X.31 test
- Read the L1 counter and measurement time

On a BRI or U-interface leased line

- Status
- Level measuring
- Service tests
- BERT in end-to-end mode (e.g. with a loopbox on the remote end)

On a PRI leased line (permanent circuit)

- Status
- BERT in end-to-end mode (e.g. with a loopbox on the remote end)
- Read the L1 counter and measurement time

■ Test reports



```
Test reports
1 AMP_1
2 Test1
3 frei
4 frei
5 frei
DATE
```



■ Start



```
save as:
919650
DEL. 3b>AB
```



Enter own number



Select service



```
Service check
3/16 3.1 kHz audio
```

Automatic Start the test series from the Test reports menu.

If the automatic test series is started by pressing function key 4, you must first enter a name for it to be saved under.

Select a memory location (record)

Select "Start"

Accept the suggested record name or enter a new name (see page 102).

Enter Own number; on accesses using the DSS1 protocol, also enter the remote number.

Use the cursor keys to select the service.
(required for the suppl.serv.test)

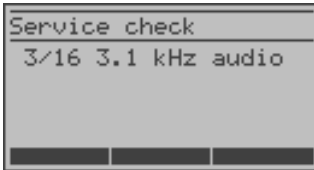
Start the automatic test

During the test sequence, the ARGUS will display the current single test.



Interrupting a test

Terminating the test (early):



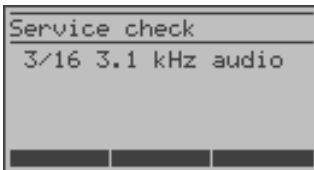
Interrupt the automatic test



The ARGUS will terminate the test sequence, any test results already gathered will be lost. Any "old" data stored under this data record number from a prior test will be retained.

The ARGUS will return to the next higher menu.

Skipping individual tests:



A single test can be skipped: In this example, the ARGUS is running a Service check.

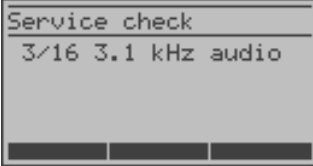
Stop the current single test



The ARGUS will jump to the next single test (e.g. to the BERT).



Resuming a test:

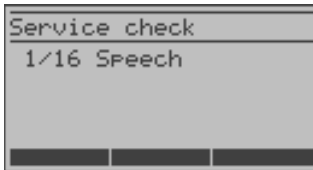


The ARGUS can resume an interrupted single test: In this example, the ARGUS is running a Service test.

Stop the current single test



The ARGUS repeats the “disturbed” single test. (in the example, Service test)



13.2 Display Results

Depending on the type of access under test, the ARGUS displays the results stored for the single tests in the following order:

On a BRI or U-interface access

- Status
- Level measuring
- Service tests
- BERT
- Supplementary Services Test
- X.31 test
- CF Interrogation
- MSN Interrogation

On a PRI access

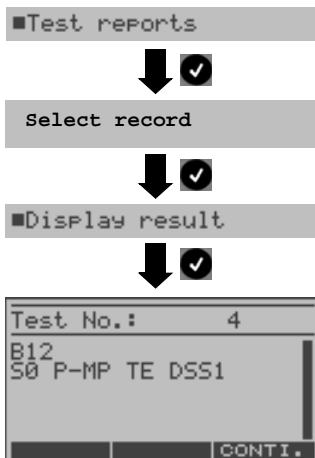
- Status
- Service tests
- BERT
- L1 counter and measurement time
- Supplementary Services Test
- X.31 test
- CF Interrogation

On a BRI or U-interface leased line

- Status
- Level measuring
- Service tests
- BERT

On a PRI leased line (permanent circuit)

- Status
- BERT
- L1 counter and measurement time



The ARGUS - Main menu

Display the test results

The ARGUS will first display the status of the ISDN access under test.

<CONTI.> The ARGUS will display, one after the other, the results of the next single test.

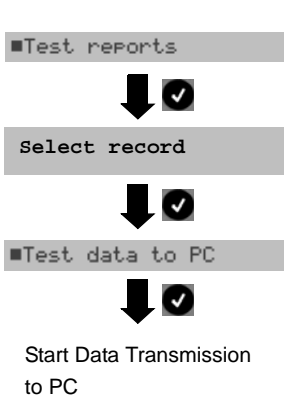
Use the cursor keys to scroll through the results of the single tests.



Close the results display.

13.3 Sending the Results of a Test to a PC

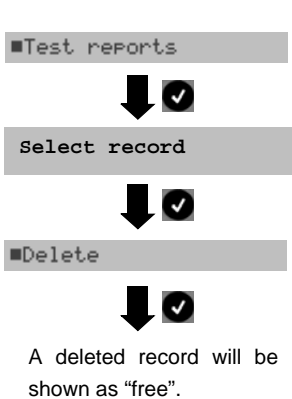
The test result records can be sent to a PC, where they can be visualized and archived. Use the included USB cable to connect the ARGUS (ARGUS “USB” jack) to a USB jack on your PC and then start the ARGUS WINplus software.



The ARGUS - Main menu

Use the cursor keys to select the record.

13.4 Deleting the results of a test



The ARGUS - Main menu

Use the cursor keys to select the record.

Delete the selected record.

For information on how to delete all records, see on page 134 "Reset".

13.5 Sending the results of all of the tests to a PC

The ARGUS will send the results of all of the tests to the connected PC. Use the included USB cable to connect the ARGUS (ARGUS “USB” jack) to the PC.

The ARGUS - Main menu

■Test reports



Select record



■All tests to PC



Start transfer of
data to PC

Use the cursor keys to select the record.

14 Level measuring

14.1 Level measuring on a BRI access

Level measurement – connected line

The ARGUS measures the level of the received useful signal. In TE mode, it also measures the phantom feed. The measurement will be updated continuously.

The ARGUS in its Main menu

■Level measuring



■Connected line



Start measurement

```

Level measuring
Level:      OK
0,78 V
Voltage:    OK   normal
39,8V
[ ] [R>ON] [NEW]
    
```

The ARGUS will display the level of the useful signal (Level) and the level of the feed (Voltage).

Measurement results:

- Evaluation of the useful signal level:

<<	Level is too low
>>	Level is too high
OK	Level is in order (0.75V ^{+20%} _{-33%} , i.e. from 0.9V to 0.5V)
none	no level

- Evaluation of the level of the feed (Voltage)

OK normal	Normal feed (40V ^{+4.25%} _{-13.75%} , i.e. from 41.7V to 34.5V)
OK Rev_	Inverted phantom feed
NONE	No feed (Voltage)

< R>ON >	100Ω resistor switched in
<R>OFF >	100Ω resistor switched out
<NEW>	to set up Layer 1 again - to ensure a reasonable measurement.

Level measurement - other TE

In TE mode, the ARGUS will measure the level of a terminal connected in parallel. In this case, the ARGUS is passive. Layer 1 must be activated on the terminal. The ARGUS updates its measurement continuously.

The ARGUS in its Main menu

```
■Level measuring
```



```
■Other TE
```



```
Level measuring
Other TE
Level: 0,82V OK

[ R>ON ] [ NEW ]
```

Start measurement

The ARGUS displays the level of the useful signal and an evaluation of this level:

<<	Level is too low
>>	Level is too high
OK	Level is in order (0.75V ^{+20%} _{-33%} , i.e. from 0.9V to 0.5V)
none	no level
< R>ON >	100Ω resistor switched in
<R>OFF >	100Ω resistor switched out
<NEW>	to set up Layer 1 again - to ensure a reasonable measurement.

14.2 Voltage Measurement on a U-Interface Access

Measurement of the feed voltage on a U-interface

■Voltage U



Voltage U
U: 95.0V

ARGUS in its Level measuring menu

Start measurement

The ARGUS will display the level of the feed voltage.
The measurement will be updated continuously.

Measurement of the U-interface under load

The ARGUS measures the voltage on the U-interface under various selectable loads and displays the calculated current and power. From these values, it is possible to estimate the length of the line.

■Power U



Level measuring
Power U
R:64,4 kΩ U: 95 V
P: 138 mW I:1,5 mA

ARGUS in its Level measuring menu

Start measurement

The ARGUS displays the switched-in load in $k\Omega$, the measured voltage in Volts, the calculated power in mW and the calculated current in mA.

<++> To increase the load by one increment (i.e. the resistance is lowered)

<--> To decrease the load by one increment (i.e. the resistance is raised)

Step	Load / $k\Omega$	Maximum voltage / V
1	64	Approx. 126.0 ¹⁾
2	28	Approx. 126.0 ¹⁾
3	19	Approx. 114.0 ¹⁾
4	14	Approx. 114.0 ¹⁾
5	11	Approx. 114.0 ¹⁾

6	9	Approx. 109.4 ²⁾
7	8	Approx. 101.8 ²⁾
8	7	Approx. 94.6 ²⁾
9	6	Approx. 75.0 ¹⁾
10	5,5	Approx. 75.0 ¹⁾
11	5	Approx. 75.0 ¹⁾
12	4,5	Approx. 75.0 ¹⁾
13	4,2	Approx. 73.9 ²⁾
14	3,9	Approx. 71.2 ²⁾
15	2,7	Approx. 59.5 ²⁾

¹⁾ The voltage is limited by the power capacity of the individual circuit elements

²⁾ The voltage is limited by the maximum power (1300mW)

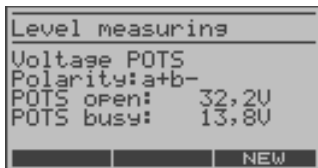
When switching the load levels, the power limitations of the components within the ARGUS and the maximum permissible power (1300mW) of the U-interface must be taken into consideration. Therefore, the ARGUS will only permit the load to be switched another increment when the specified voltage will not be exceeded.

14.3 Level measuring on a POTS access

The ARGUS measures the voltage level in both the normal case and when the line is "busy" (trunk line).



■Level measuring



Level measuring
Voltage POTS
Polarity:a+b-
POTS open: 32,2V
POTS busy: 13,8V
NEW

The ARGUS in its Main menu

Start measurement

The ARGUS will display the polarity of the 2-wire POTS line (red plug "a"; black plug "b") as well as the "on hook" and "off hook" voltage levels.

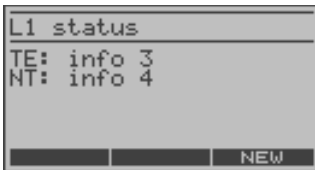
<NEW> To repeat the measurement

15 L1 status

15.1 The L1 Status of a BRI Access

The ARGUS displays in TE mode the current status of Layer 1: which signal is received from the remote end (Rx) and which signal does the ARGUS send (Tx).

■ L1 state



The ARGUS in its Main menu

The ARGUS displays the status of Layer 1 or of the signal, which is currently being sent (Info 0 Info 4).

<NEW>

To setup Layer 1 again (if necessary).

15.2 The L1 Status of a PRI Access

The ARGUS displays the Layer 1 alarms and messages, which provide detailed information regarding the state of the PRI access and the transmission line (For further information, see the CCITT/ITU guidelines G.703 and G.704).

The ARGUS in its Main menu

■ L1 state



```

L1 status
Durat.      05:18
Signal      + wires X
no A bit    + noAIS +
CRC4det     + FAS   +
E bit       + (11)
SAVE  X   RESET
    
```

The ARGUS displays the time that has elapsed since the ARGUS was initially started or it was last reset in minutes and seconds (05:18).

The measurement time and all Layer 1 alarms and messages are updated continuously.

Use the cursor keys to scroll.

< X >

The PRI relay for the Rx/Tx pin assignment will be toggled to its other position, regardless of the state that it was in before.

This function is only available with the L1 status menu, if there is currently no signal. The state of the relay will remain unchanged when you close the L1 status menu.

Wires = means that Rx/Tx are normal
Wires X means that Rx/Tx are inverted

<RESET>

Reset the History function and all counters.

<SAVE>

Save the results (see page 102)

OK symbol: +


Error symbol: -

History symbol: ! This indicates that, regardless of the current state of the access (+ or -), an error occurred during the test period.

The meaning of the individual displays:

Signal	The ARGUS has received the correct signal sent from the remote end (access or terminal depending on the operation mode TE or NT simulation) and indicates this by a + . If Rx and Tx are connected normally a "=" will be shown after the signal; in the event that they are inverted (swapped) an " x" will be displayed."
FAS	(Frame Alignment Signal) Indicates whether the ARGUS could correctly synchronize with the incoming 2 Mbit data stream's alternating frame identification word or message word and the, perhaps present, CRC4-superframe structure.
CRC4 det	If CRC4-monitoring is active for the access or the terminal and the ARGUS is able to synchronize itself to the CRC4 superframe, it will indicate this by displaying "CRC det +". If "CRC det –" is displayed together with "Signal +" and "FAS +", this indicates that no CRC4 is active. To prevent power up effects (transients), we recommend that you set the display and counter to a defined initial state with a RESET.
Code HDB3	Display the transmission code used (currently set to HDB3)
noA-Bit	The remote end uses the A-Bit to signal whether the circuit is available on their receive side. noA-Bit + means A=0: Idle state noA-Bit - means A=1: Return direction is not available
noAIS	(Alarm Indication Signal) AIS will be set if a component on the transmission line determines that the signal they have received is faulty (e.g., in the event, that they lose frame synchronization) and has sent a Time –1 (=AIS) to indicate this. noAIS = + : No AIS occurred.
Sa5-Bit (Rx ,Tx)	The Sa5-Bit (Rx) sent by the ARGUS can be configured in the Configuration menu (see "Sa5 bits settings" on page 122.)
Sa6-Bit (Rx ,Tx)	The Sa6-Bit (Rx) sent by the ARGUS can be configured in the Configuration menu (see "Sa6 word settings" on page 122.)
E-Bit	With the two E-Bits, E1 and E2, the remote end will report any CRC4-errors that it finds on its receive side in the first or second.submultiframe (the E-Bit will be set to 0). E-Bit11+ : if both E-Bits are set to 1, no error occurred E-Bit11+! : A CRC4-error was found (indicated by the "!"), however the circuit is in largest part OK (see the E-Bit counter Ecnt or the CRC4 error counter CRCErr)

Ecnt	The E-Bit counter counts the reported E-Bit errors individually; in other word, all the cases in which a faulty CRC4 submultiframe was received (counts at a maximum of 1kHz).
CRC Err	The CRC4 error counter totals the number of CRC4 submultiframes in which errors were detected.
CRC rel	gives the CRC4 error rate, in other words, the number of faulty CRC4 frames relative to the total number of CRC4 frames received.
Code Err	Counter for the detected HDB3 transmission code errors
Code rel	Transmission code - error rate
Frm. Err	Counter for faulty 2Mbit frames.

When running MegaBERT unframed in permanent circuit mode, if the menu L1 status is opened (via the -Key or the Test Manager), the display will only show the parameters Signal and noAIS.

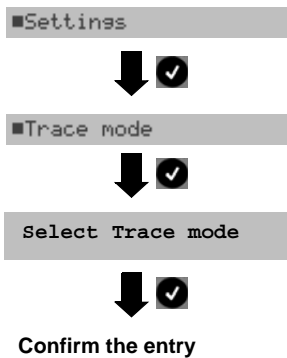
16 Settings

The ARGUS can be configured to suit your special requirements. The default (factory) settings can be restored by selecting “Reset” (see page 134 Reset).

16.1 PC/Trace

The ARGUS remains active and either saves the data from the D-channel (all of the D-channel messages sent to and received from the network) in its internal Flash memory or passes the data directly to the connected PC. The Remote function is optional.

The ARGUS in its Main menu



Auto PC sync.

The D-channel data will be sent to the PC.
Even after it is switched on again, the ARGUS remains in Trace mode and passes D-channel data to the PC (“PC/Trace” LED flashes).


Manual PC sync.

The D-channel data will be sent to the PC (“PC/Trace” will flash).
When the ARGUS is switched off and then back on again, Trace mode will be off.

Recording

The D-channel data is stored in the internal Flash memory (the “PC/Trace” LED flashes slowly)

If the ARGUS cannot send the data to the PC without errors, the “PC/Trace” LED will flash at 5Hz (5 times per sec).

The currently active settings will be marked in the display with a .



The D-channel data saved in the Flash memory can be transferred to the PC in the “Recorder” mode (see “BRI / PRI Recorder” on page 46.).

16.2 Settings: ISDN

The operation is the same for all configurations and will be illustrated with a single example:

■Settings



■ISDN



■Protocol



■Automatic



The ARGUS saves the settings and returns to the next higher menu.

The ARGUS - Main menu

Use the cursor keys to select, e.g. Protocol.


Use the cursor keys to select the setting for the protocol (e.g. Automatic).




The ARGUS will return to the "ISDN config." menu without making any changes.

Settings in ISDN:


Name Displayed on the ARGUS	Comment
L1 permanent?	On a BRI connection in NT mode, Layer 1 (L1) is permanently active.
Protocol	As an alternative to automatic protocol determination (setting: Automatic), you can also set the Layer-3 D-channel protocol manually. The ARGUS will save the protocol setting permanently, i.e. it will use this protocol the next time that it is switched on.

Alerting mode	<p>You can specify whether, for an incoming call on a BRI point- to- point access, the ARGUS should only display the access number without extension or the complete number with extension.</p> <p>If it is set to “Manual”, the ARGUS will display the extension (An incoming call will be signaled. The ARGUS will send the Layer 3 message “Alert” when it accepts the call. The digits of the extension that have been sent by this point will be displayed.).</p> <p> With the Manual setting, an incoming call must be answered within 20 seconds or it will be lost. Furthermore, you should note that the remote subscriber will not hear a ringing tone.</p> <p>If it is set to “Automatically”, the ARGUS will only display the access number without extension or, depending on the configuration of the access in the exchange, it may not display the number called at all.</p>						
Clock mode	<p>This parameter sets where the clock will be generated in the case of a BRI or PRI access. You can either specify that the ARGUS generates the clock (is Master) or that it is the slave of a clock generated at the other end (Slave).</p> <p>Default setting:</p> <table data-bbox="378 853 647 1007"> <tr> <td>NT mode</td> <td>Master</td> </tr> <tr> <td>TE mode</td> <td>Slave</td> </tr> <tr> <td>Permanent switch circuit (leased line)</td> <td>Slave</td> </tr> </table> <p>This setting will not be saved permanently, rather only applies for the current measurement.</p>	NT mode	Master	TE mode	Slave	Permanent switch circuit (leased line)	Slave
NT mode	Master						
TE mode	Slave						
Permanent switch circuit (leased line)	Slave						
BRI termination	<p>Independent of the operation mode (TE or NT), a terminating resistor can be switched-in on the BRI access.</p> <p>Default setting:</p> <table data-bbox="378 1206 930 1297"> <tr> <td>NT mode</td> <td>Terminating resistor switched-in</td> </tr> <tr> <td>TE mode</td> <td>No terminating resistor is switched in</td> </tr> <tr> <td>Leased line</td> <td>No terminating resistor is switched in</td> </tr> </table> <p>This setting will not be saved permanently, rather only applies for the current measurement.</p>	NT mode	Terminating resistor switched-in	TE mode	No terminating resistor is switched in	Leased line	No terminating resistor is switched in
NT mode	Terminating resistor switched-in						
TE mode	No terminating resistor is switched in						
Leased line	No terminating resistor is switched in						

PRI termination	Depending on the transmission technique (75 Ohm coaxial-cable or twisted-pair cable with an impedance of 120 Ohms) used, the PRI termination resistor must be selected accordingly. The default setting is country-specific and corresponds to the system most common in the respective country: Germany, Austria, England, the Netherlands, France, ... : 120 Ohm Spain, Italy, Greece, ... 75 Ohm												
PRI Monitor	Select: Monitoring the D-channel or monitoring Layer 1 In the case of the V5 option (selection from three time slots), this setting is not available.												
PRI haul mode	The ARGUS supports the setting of the haul mode (sensitivity) of the PRI access. By default, "short haul" will be suggested. short haul: Normal sensitivity, i.e. signal reception with cable attenuation of up to ca. -10dB. long haul: Increased sensitivity, i.e. signal reception with cable attenuation of up to ca. -35dB. This corresponds to a distance of 1600m with 22AWG twisted pair cable. When using greater sensitivity ("long haul" mode) on longer lines, feedback on the line can cause faulty synchronization.												
Sa5 bits settings	The ARGUS can set the Sa5 bits on a PRI access. By default, the Sa5 bits are set to 0000.  The Sa5 bits have no significance between an NTPM and a PBX system. This setting will not be saved permanently, rather only applies for the current measurement. <table><tr><td>Sa5 coding</td><td>Meaning</td><td>Meaning</td></tr><tr><td>0000</td><td>Network -> Terminal</td><td>Terminal -> Network</td></tr><tr><td>1111</td><td>Direction code</td><td>Ack. for loop command</td></tr><tr><td></td><td>-----</td><td>Direction code</td></tr></table>	Sa5 coding	Meaning	Meaning	0000	Network -> Terminal	Terminal -> Network	1111	Direction code	Ack. for loop command		-----	Direction code
Sa5 coding	Meaning	Meaning											
0000	Network -> Terminal	Terminal -> Network											
1111	Direction code	Ack. for loop command											
	-----	Direction code											
Sa6 word settings	The ARGUS can set the Sa6 bits on a PRI access. By default, they are set to 0000. This setting will not be saved permanently												

	Sa6 coding	Meaning	Meaning
	0000	Network -> Terminal Setting for normal operation (default)	Terminal -> Network Setting for normal operation, idle (default)
	1010	Switches a loop in the NTPM. In leased line mode, a BERT can then be performed using the loop setup there. Important: The ARGUS must be set to "Leased line" even if it is a dialup access!	-----
	1111	Switches a loop in the LEPM. In leased line mode, a BERT can then be performed using the loop setup there. Important: The ARGUS must be set to "Leased line" even if it is a dialup access!	AIS on U _{2an} of the NTPM
A bit	Using the ARGUS, you can set the A bit on a PRI access. By default, it is preset to A=0 (automatic). This setting will not be saved permanently		
CRC4 mode	CRC4 monitoring can be switched on or off manually. By default, it is preset to CRC4. This setting will not be saved permanently		

Call parameter	<p>Two different parameters can be set for (ISDN) calls generated on both the network-side (ARGUS in NT mode) and on the user-side (ARGUS in TE mode):</p> <p>1. Type of number (TON) for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal:</p> <p>Network-side: Net CGN TON / Net CDN TON</p> <p>User-side: User CGN TON / User CDN TON</p> <p>2. Numbering Plan (NP) for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal</p> <p>Network-side: Net-CGN-NP/ Net-CDN-NP</p> <p>User-side: User CGN NP / User-CDN-NP</p> <p>Possible settings:</p> <p>For TON: unknown, international, national, network spec., subscriber, abbreviated.</p> <p>For NP: unknown, ISDN/telephony, data, telex, national stand., private</p>
Services	<p>Up to three user-specific services (user spec.1 to user spec.3) can entered and saved.</p> <p>For each "user spec. service", you must enter the info-elements BCAP, HLC and LLC in hexadecimal (switch with the left softkey). To do so, use the keypad and the < A . . F < softkey (e.g. to enter a "C", press the softkey three times; for a "F", press it six times).</p>
Call Acceptance	<p>If the ARGUS is set to "own MSN/DDI" and is in TE mode on a P-MP access, it will only signal those calls which are placed to the MSN (on a P-P access, the DDI) of the access under test.</p> <p>If set to "all MSN/DDI", the ARGUS signals all calls.</p> <p>Prerequisite:</p> <ul style="list-style-type: none"> - the "own" number must be entered in the call number memory under "own number" (see "Saving Call Numbers" on page 133.) - the incoming call must have a destination MSN <p>The default setting is "all MSN/DDI".</p> <p>This setting will be saved permanently.</p>

Voice coding	<p>There are two options for coding voice data in a B-channel:</p> <ul style="list-style-type: none"> - A-law (default) - μ-law <p>This setting will be reset to its default value when the ARGUS is switched off.</p>
DTMF / Keypad	DTMF or keypad setting
Dest. no. MSN	A destination number can be entered, which the ARGUS will use for MSN interrogation (default: 0043).
CUG Index	<p>Entry of the CUG index, which the ARGUS should use when testing the CUG (Closed User Group) service.</p> <p>Default: 148</p>
Keypad	<p>A maximum of three Keypad Infos can be stored.</p> <p>This setting will be saved permanently.</p> <p>First use the vertical cursor keys to select one of the three available memory locations for Keypad Infos.</p> <p><EDIT > Select a Keypad Info entry to be edited. Afterwards, use the keypad to enter the Keypad Info.</p> <p> Save Keypad Info</p>

16.3 Settings: BERT

The operation is the same for all configurations and will be illustrated with a single example:

The ARGUS - Main menu

■Settings



■BERT



■BERT time



Enter the BERT time





The ARGUS saves the settings and returns to the next higher menu.

Use the keypad to enter the duration of the BERT.



The ARGUS will return to the "BERT config." menu without making any changes.

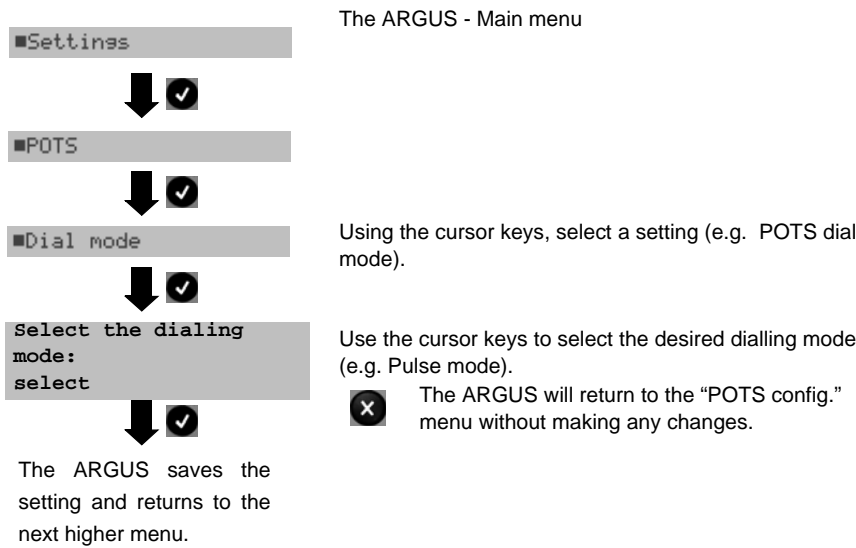
Settings for the BERT:

Display Name on the ARGUS	Comment
BERT-duration	<p>You can enter measurement times ranging from 1 minute (default setting) to 90 hours and 59 minutes (= 99:59).</p> <p> If the time is set to 00:00 (=BERT with unlimited measurement time), the BERT will not stop automatically. In this case, the user must terminate the BERT (by pressing the .</p>

Bit patt. BRI/ U	<p>This function is used to select the bit pattern to be sent cyclically by the ARGUS to perform a BERT on a BRI or U-interface access. There are several predefined bit patterns available ($2^{11}-1$ = default).</p> <p>Additionally, it is also possible to enter a 16 bit long pattern of your choice in binary.</p> <p>Use the horizontal cursor keys to move the cursor right or left.</p> <p>: Changes the digit before the cursor from 1 to 0</p>
Bit pattern PRI	<p>This function is used to select the bit pattern to be sent cyclically by the ARGUS to perform a BERT on a PRI access (see "Bit patt. BRI/U").</p> <p>($2^{15}-1$ = default setting).</p>
Error level	<p>This is the level used to evaluate whether the BERT had an "acceptable" bit error rate.</p> <p>If the BERT has a bit error rate, which exceeds this error level, the ARGUS will display a "NO" as the test result.</p> <p>Using the keypad, this parameter can be set to any value from 01 (= 10^{-01}) to 99 (= 10^{-99}). The default threshold (error level) is 10^{-06} (1E-06). That means that, in the event that the bit error rate is less than 10^{-06} (one error in 10^6= 1,000,000 sent bits), the bit error test will be evaluated as OK.</p>
HRX value	<p>Setting for the HRX value</p> <p>(Hypothetical Reference Connections, see the ITU-T G.821)</p> <p>Using the keypad, you can enter a value ranging from 0 to 100%.</p>

16.4 Settings: POTS

The operation is the same for all configurations and will be illustrated with a single example:



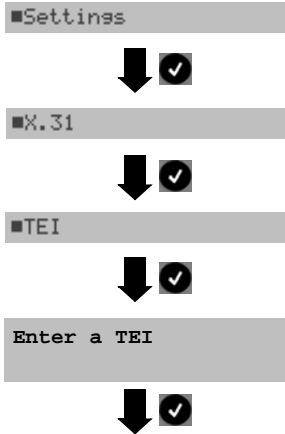
Settings on a POTS access:

Display ARGUS	on	Comment
Dial mode		Selection of the dialling mode: DTMF or pulse dialing
CLIP mode		Select the transfer procedure used to pass the call number: FSK CLIP via a method similar to a modem (for Germany as well as some other parts of Europe) DTMF CLIP via DTMF (for Scandinavia and the Netherlands) The ARGUS will automatically detect that a CLIP was sent using DTMF with the polarity reversal and will set itself accordingly (e.g. Netherlands).
DTMF parameter		Settings for the three parameters Level, Duration and Interval of the DTMF signals generated during POTS (analog) operation.

Level	Setting the DTMF level: The level can range between -30dB and +9 dB (default: -3dB). Use the vertical cursor keys to raise or lower the level by 3dB.
Duration	Setting the DTMF time: The duration of the signal can take a value between 40ms and 1s (default: 80ms). Use the vertical cursor keys to raise or lower the value. In the range 40 - 200 ms 10 ms steps In the range 200-300 ms 20 ms steps In the range 300 - 1000 ms 100 ms steps
DTMF interval	Setting the interval between two DTMF characters: The interval between the characters can take a value between 40ms and 1 second (default: 80ms). Use the vertical cursor keys to raise or lower the value. In the range 40 - 200 ms 10 ms steps In the range 200-300 ms 20 ms steps In the range 300 - 1000 ms 100 ms steps
Defaults	Restores the default settings: Level = -3 dB, Time = 80 ms, Separation = 80 ms
FLASH time	Sets the length of a FLASH. This setting is needed in order to use special features of a PBX. The FLASH time can take a value between 40ms and 1s. Use the vertical cursor keys to raise or lower the value. In the range 40 - 200 ms 10 ms steps In the range 200-300 ms 20 ms steps In the range 300 - 1000 ms 100 ms steps

16.5 Settings: X.31

The ARGUS in its Main menu



Use the cursor keys to select a setting, e.g. TEI.

Enter the TEI on the keypad.



The ARGUS will return to the next higher menu without making any changes.

The ARGUS saves the settings and returns to the next higher menu.

Display ARGUS	on	Comment
TEI		Entry (from the keypad) of the TEIs to be used in the X.31 test. If you enter **, the ARGUS will automatically select a TEI.
LCN		Entry (from the keypad) of the LCN to be used in the X.31 test.

16.6 Settings: ARGUS settings

The operation is the same for all configurations and will be illustrated with a single example:

ARGUS in the Main menu

■Settings



■Device



■Menu language



Menu language
select



Using the cursor keys, select a setting (e.g. Menu language).

Use the cursor keys to select desired language (e.g. Deutsch).



The ARGUS will return to the "Device settings" menu without making any changes.

The ARGUS saves the settings and returns to the next higher menu.

Settings on the ARGUS:

Display ARGUS on	Comment
Menu language	Selection of the menu language
LCD contrast	<p>The display contrast can be changed in 16 steps.</p> <p>The contrast can be increased or decreased using the cursor keys.</p> <p>The display shows a vertical arrow, which shows the current setting on a scale from low to high contrast.</p>

Enter date / time	<p>Entry of the date and time (initialisation of the internal clock) via the keypad.</p> <p>Use the vertical cursor keys to scroll to the next line in the display. The entered time will be continuously updated by the ARGUS's real time clock as long as the power is not interrupted. When the power is switched off (the ARGUS switched off without accumulators), the clock will run a few more weeks on its internal supply. If the backup supply is exhausted, the time will be undefined and must be set again.</p>
PC Interface	<p>Select the interface to be used for connecting to the PC.</p> <p>Default setting: USB</p>
V.24 Baud rate	<p>Sets the maximum baud rate to be used by the ARGUS to communicate with a PC via the V.24 interface.</p>
Alarm bell	<p>The ARGUS signals with an alarm in a variety of situations, e.g. when a bit error occurs in a BERT. When this parameter is set to "off", all audible alarms are suppressed.</p>
Power Down	<ul style="list-style-type: none"> - Set the how long the ARGUS can remain idle before it will switch to power down mode. If power down mode is disabled, the ARGUS will display a message, when it is switched on, warning that this will lead to a shorter battery life. - Setting how long the background lighting will remain on.
Software option	<p>To enable a software option (e.g. additional functions), you must first enter a software key via the keypad.</p>

16.7 Saving Call Numbers

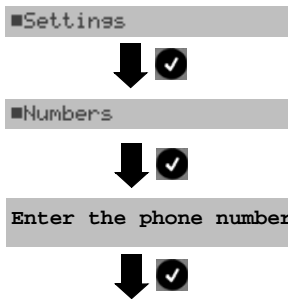
Ten call numbers with a maximum of 24-places can be entered in the speed-dialing memory.



The first speed-dial number **must** be the **own** call number of the access under test (this is especially important for the automatic Service check).

In the "Remote No.1-8" memory locations, you can save remote call numbers. In the X.31 test number memory location, the ARGUS expects the entry of the X.25 access number for the X.31 test (page 74).

The ARGUS - Main menu



The ARGUS saves the number and returns to the next higher menu.

Use the cursor keys to scroll through the speed-dialing memory.

Enter the number via the keypad.

< DEL > Delete the character before the cursor



The ARGUS will return to the next higher menu without saving the number.

When entering an own call number with an extension (operation of the ARGUS on a PBX access), observe the following:

The extension is separated from the access number by a #.

For outgoing calls, the ARGUS uses the entire call number (without #) as the number called (CDPN or DAD) and, for the calling number (DSS1-CGPN or 1TR6-OAD), only the number after the #, in other words the extension. A "#" at the beginning of a call number is treated as a valid character.

Example: 02351/9970-45 is entered as 023519970#45



If the "#" is at the end of a number, when the number is later dialed it will be done without CGPN or OAD. This is important for some PBXs.

16.8 Reset

The ARGUS will reset all of the parameters to their default values.



The numbers in the speed-dialing memory and all of the test results stored in the ARGUS (e.g. BERT results or automatic test sequences) will be deleted.

The following settings are possible:

	Default
PC/Trace	Off
ISDN parameters	
L1 permanent?	no only for BRI NT
Protocol	Automatic
Alerting mode	Automatic
BRI termination	TE mode: on NT mode: off
PRI termination	120 Ohm
PRI haul mode	short haul
Sa5 bits	0000
Setting the Sa6 Bits	0000
A bit	A=0 (automatic)
CRC4 mode	CRC4 automatic
Call acceptance	all MSN/DDI
Call parameter	depending on country version
Clock mode	TE mode: Slave NT mode, Leased line: Master
Voice coding	A-Law
DTMF / Keypad	DTMF
Dest. no. MSN	0043
CUG Index	148
Keypad	The Keypad Infos will be deleted!
BERT parameters	
BERT time	1 min
BERT error level	10 ⁻⁰⁶
BERT bit pattern	BRI/U: 2 ¹¹ -1 PRI: 2 ¹⁵ -1
BERT-HRX	15%

Bit pattern "freely-defined" 0000000000000000

POTS

POTS dialing mode	DTMF
POTS CLIP	FSK
POTS FLASH time	80 ms
DTMF parameter	80ms/80ms/0dB

X.31

TEI	** (automatically)
LCN	1

Device parameters

Menu language	depending on country version
LCD contrast	Average value
Enter date / time	1.1.2000 / 12:00
PC Interface	USB
V.24 Baud rate	57,600 Baud
Alarm bell	Off

ARGUS in the Main menu

■Settings



■Reset



Reset
all parameters?

Security query



< YES > Reset ARGUS to its default values

The ARGUS will
return the next higher
menu

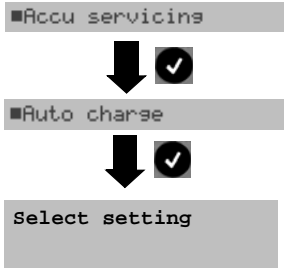
17 Accu Servicing

Automatic recharging of the accumulators when the ARGUS is switched on

The ARGUS automatically recharges the accumulators (also shortened to “accus”), if the ARGUS is connected to the plug-in power supply and the accumulator voltage is less than 6.4 volts (use only the supplied accumulators). While charging, the ARGUS displays the message “Charge accu”.

If you press and hold the power switch, the ARGUS will switch off before the accumulators are recharged. Otherwise, the ARGUS will switch itself off automatically as soon as the accumulators are recharged.

Automatic recharging of the accumulators in the background (trickle charge)



If the trickle charge setting is set to “ON”, the ARGUS will begin charging the accus automatically while it is in operation (if the power supply is plugged in) as soon as the voltage drops below 6.4 V.
(the battery symbol will be shown in the display).



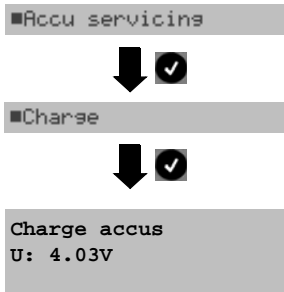
If the ARGUS is disconnected from its power supply after a short while, it is possible that the accumulators may not be fully charged. In such case, when the ARGUS is reconnected to the power supply, it will not begin to charge the accumulators again until their voltage drops below 6.4V once more.

Accu servicing

The ARGUS will display the current charge of the accumulators, if no power supply is connected.

When the power supply is connected, the accumulators in the ARGUS can be completely discharged or immediately (without being first discharged) recharged. The discharge procedure takes up to 7 hours. After a pause of about 30 minutes, the ARGUS will automatically begin to recharge the accumulators.

ARGUS in its Main menu

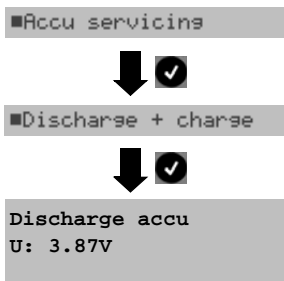


Start charging the accumulators
(the plug-in power supply must be connected)

The ARGUS will display the level of charge and the voltage while charging the accumulators.

Discharging the accumulators

The accumulators will first be fully discharged and then - after a brief pause - automatically recharged.



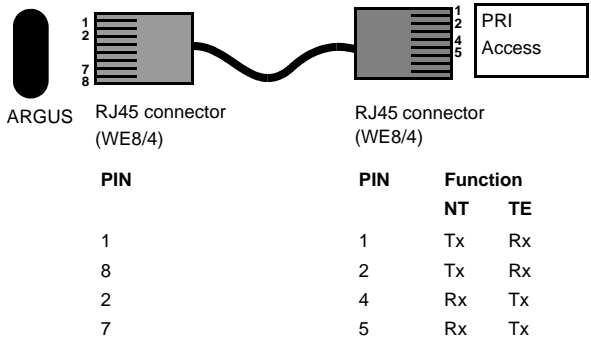
18 Connection to a PRI Network

Since there is no commonly accepted standard for the connections in the 2 Mbit sector, you will be confronted with different forms of connectors depending on the type of terminal and the network termination used.

The ARGUS changes the connector pin assignments automatically in accordance with the mode, TE or NT. Additionally, it is also possible to change the pin assignments manually in the L1-Status menu.

18.1 Connector Pin Assignments on the ARGUS 125 (Line)

In TE mode, the ARGUS sends on lines 4 and 5, in NT-Mode on 1 and 2 (see illustration). An adapter cable, which is suitable for the respective ISDN network/system, can be connected using the RJ45-RJ45 adapter.



19 Appendix

A) Acronyms

3PTY	Three Party Service
AI	Action Indicator
AOC	Advice of Charge
AOC-D	Advice of Charge Charging information during the call and at the end of the call
AOC-E	Advice of Charge Charging information at the end of the call
AWS	Call Forwarding (Anrufweiserschaltung)
BC	Bearer Capability
BER	Basic Encoding Rules / Bit Error Rate
BERT	Bit Error Rate Test
CALL PROC	CALL PROCeeding message
CCBS	Completion of Calls to Busy Subscriber
CCNR	Call Complete No Response Automatic Callback if the called party did not answer
CD	Call Deflection
CDPN	Called Party Number
CF	Call Forwarding
CFB	Call Forwarding Busy
CFNR	Call Forwarding No Reply
CFU	Call Forwarding Unconditional
CGPN	CallinG Party Number
CLIP	Calling Line Identification Presentation Display caller's number
CLIR	Calling Line Identification Restriction Suppress display of the caller's number
COLP	Connected Line Identification Presentation Display the number of the party called
COLR	Connected Line Identification Restriction Suppress the display of the number of the party called
CONN	CONNect Message
CONN ACK	CONNect ACKnowledge Message
CR	Call Reference
CT	Call Transfer
CUG	Closed User Group
CW	Call Waiting

DAD	Destination Address (1TR6)
DDI	Direct Dialling In (dialling in to an extension directly)
DISC	DISConnect Message
DM	Supplementary services (Dienstmerkmal)
DTMF	Dual Tone Multi Frequency
EAZ	Terminal Ident. No. (Endgeräteauswahlziffer - 1TR6)
ECT	Explicit Call Transfer / call forwarding or explicit call diversion
E-DSS1	European Digital Subscriber Signalling System Number 1
GBG	Closed user group (CUG) (Geschlossene Benutzer Gruppe)
HLC	High Layer Compatibility
HOLD	Call Hold
ISDN	Integrated Services Digital Network
INFO	INFOrmation Message
LAPD	Link Access Procedure for D-channel channels
LCN	Logical channel number /X.25 channel number
LLC	Low Layer Compatibility
MCID	Malicious Call Identification
MSN	Multiple Subscriber Number
NSF	Network Specific Facilities
NT	Network Termination
OAD	Origination Address (1TR6)
PD	Protocol Discriminator
REL	RELease Message
REL ACK	RELease ACKnowledge Message
REL COMPL	RELease COMPLete Message
SCI	Sending Complete Indication
SIN	Service Indicator (1TR6)
SUB	Sub-addressing / Sub-addressing is possible
SUSP	SUSPend Message
TE	TErminAl, Terminal Equipment
TEI	Terminal Endpoint Identifier
TP	Terminal Portability / Moving the terminal on the bus
UUS	User-to-User Signalling / transfer of user data

B) CAUSE-Messages – DSS1 Protocol

Dec.	Cause	Description
01	Unallocated (unassigned) number	No access under this call number
02	No route to specified transit network	Transit network not reachable
03	No route to destination	Wrong route or routing error
06	Channel unacceptable	B-channel for the sending system not acceptable
07	Call awarded and being delivered in an established channel	Call awarded and connected in an already existing channel (e.g., X.25 SVC)
16	Normal call clearing	Normal disconnect
17	User busy	The number called is busy
18	No user responding	No terminal equipment answered (Timer NT303 / NT310 time-out)
19	No answer from user (user alerted)	Call time too long
21	Call rejected	Call rejected (active)
22	Number changed	Call number has been changed
26	Non-selected user clearing	Incoming call not awarded to this terminal
27	Destination out of order	Destination / access out of order
28	Invalid number format (address incomplete)	Wrong call number format or call number incomplete
29	Facility rejected	Facility is not supported
30	Response to STATUS ENQUIRY	Response to status enquiry
31	Normal, unspecified	Unspecified for "normal class" (Dummy)
34	No circuit / channel available	No circuit / B-channel available
38	Network out of order	Network not operational
41	Temporary failure	Network is temporarily not operational
42	Switching equipment congestion	Switching equipment is overloaded
43	Access information discarded	Access information could not be transferred
44	Requested circuit / channel not available	Requested circuit / B-channel is not available
47	Resources unavailable, unspecified	Unspecified for "resource unavailable class" (Dummy)
49	Quality of service unavailable	The requested quality of service is not available
50	Requested facility not subscribed	Requested service attribute not subscribed
57	Bearer capability not authorized	The requested bearer capability is not enabled
58	Bearer capability not presently available	The requested bearer capability is not currently available
63	Service or option not available	Unspecified for "service unspecified or option not available class" (Dummy)
65	Bearer capability not implemented	Bearer capability is not supported
66	Channel type not implemented	Channel type is not supported
69	Requested facility not implemented	Requested facility is not supported
70	Only restricted digital information bearer capability is available	Only limited bearer capability is available

79	Service or option not implemented, service unspecified or option not implemented class" (Dummy)	Unspecified
81	Invalid call reference value	Invalid call reference value
82	Identified Channel does not exist	Requested channel is invalid
83	A suspended call exists, but this call identity does not	The call identity entered is the wrong one for the parked call
84	Call identity in use	The call identity is already in use
85	No call suspended	No call has been parked
86	Call having the requested call identity has been cleared	The parked call has been cleared
88	Incompatible destination	Incompatible destination
91	Invalid transit network selection	Invalid format for the transit network identifier
95	Invalid message, unspecified	Unspecified for "invalid message class" (Dummy)
96	Mandatory information element is missing	Mandatory information element is missing
97	Message type non-existent or not implemented	This type of message is in this phase not permitted, not defined or not supported
98	Message not compatible with call state or message type non-existent or not implemented	The content of the message is in this phase not permitted, not defined or not supported
99	Information element non-existent or not implemented	The content of the information element is in this phase not permitted, not defined or not supported
100	Invalid information element contents	Invalid content in information element
101	Message not compatible with call state	Message not valid in this phase
102	Recovery on timer expired	Error handling routine started due to time-out
111	Protocol error, unspecified	Unspecified for "protocol error class" (Dummy)
127	Interworking, unspecified	Unspecified for "interworking class" (Dummy)

C) CAUSE-Messages – 1TR6 Protocol

Dec.	Cause	Description
01	Invalid call reference value	Invalid call reference value
03	Bearer service not implemented	The service is not available in the central office or at another location in the network or the service has not been subscribed.
07	Call identity does not exist	Unknown call identity
08	Call identity in use	Call identity is already assigned to a "suspended" connection.
10	No channel available	No further B-channel is free on the subscriber's access. (only significant locally)
16	Requested facility not implemented	The entered FAC-Code is unknown in this network.
17	Requested facility not subscribed	The requested facility is not available, because the initiating or the remote subscriber is not authorized.
32	Outgoing calls barred	Outgoing calls are not possible due to the barring
33	User access busy	If the sum of the number of free B-channels, the number of occupied B-channels, the number of awarded B-channels and the number of calls without B-channel assignment equals four, new incoming calls will be cleared from the network. The calling subscriber receives a DISC with the cause "user access busy" (= 1. busy) and a busy signal.
34	Negative CUG comparison	A connection is not possible due to a negative CUG (GBG) comparison.
35	Non-existent CUG	This CUG (GBG) does not exist
37	Communication link as SPV not permitted	A connection is not possible, since for example, the RFNR-test was negative
53	Destination not obtainable	A connection cannot be made due to a wrong destination, service or supplementary services.
56	Number changed	Subscriber-B's call number has changed.
57	Out of order	The remote terminal is not ready.
58	No user responding	No terminal has answered the incoming SETUP or the subscriber call was disconnected, it is assumed that someone is present (Time-out for ringing T3AA).
59	User busy	Subscriber-B is busy
61	Incoming calls barred	The Subscriber-B has blocked incoming calls or the requested service is not supported by Subscriber-B.
62	Call rejected	To Subscriber-A: The requested connection is actively rejected by Subscriber-B (by sending a DISC as answer to the incoming SETUP). Another terminal is in the setup phase with the incoming call; the call has already been accepted by another terminal on the bus.
89	Network congestion	Network congested, e.g., switching equipment congestion, no conference set free,

90	Remote user initiated	Rejected or disconnected by remote end (subscriber or exchange).
112	Local procedure error	<p>Sent in a REL</p> <p>Disconnect due to local errors (e.g., not valid messages or parameters, time-out ...).</p> <p>Sent in a SUSP REJ</p> <p>Due to another already active supplementary service, the connection may not be "suspended".</p> <p>Sent in a RES REJ</p> <p>There is no "suspended" connection.</p> <p>Sent in a FAC REJ</p> <p>No further supplementary service request is possible, since there is still one being processed or the supplementary service requested is not available in the current state of the connection.</p>
113	Remote procedure error	Caused by an error at the remote end.
114	Remote user suspended	Connection at the remote end is in the "hold" or "suspend" state.
115	Remote user resumed	Connection at the remote end is no longer in the "hold" or "suspend" or "conference" state.
127	User Info discarded locally	<p>The message USER INFO is rejected locally. The cause is given in the message CON CON.</p> <p>Length entry (=0)</p> <p>Normal disconnect (e.g., in REL as answer to a DISC from subscriber or a change of service in a DISC): Command to the terminal to release the B-channel.</p>

D) ARGUS Error Messages

Error Number	Error Class	Cause	Description
0	E	Network	The network is not in a state defined for DSS1 or 1TR6. It may be that this state is normal for a PBX.
1 to 127	B,C,D,E	Network	DSS1 or 1TR6 causes
150	E	ARGUS	An error occurred during the supplementary service test. Frequent cause: no response from network
152	B	ARGUS	The CF-Test was started with the wrong own number.
153	E	ARGUS	No HOLD is available, but HOLD is required to test the supplementary service (ECT, 3pty)
154	E	ARGUS	CLIR or COLR could not be tested, since CLIP or COLP is not available
161	B	ARGUS	The party called did not answer within the prescribed time (approx.10 sec)
162	B	ARGUS	A call was setup to a remote subscriber, instead of being setup – as was expected – to your own number.
163	E	ARGUS	The Auto-Test could not setup a connection and therefore the AOC/D supplementary service could not be tested.
170		ARGUS	During the Suppl.services test, a call came in without a B-channel (call waiting). Therefore, it was not possible to accept the call and test.
199	B	ARGUS	A call number was entered.
200		ARGUS	Internal error
201	A	ARGUS	Network did not confirm acceptance of the call (CONN sent, no CONN_ACK received from network)
204	A	ARGUS	- Layer 2 connection was cleared-down - No response to SETUP (call setup) - Layer 2 connection could not be setup
205	A	ARGUS	Reestablish the Layer 2 connection
206		ARGUS	The selected B-channel is already busy.
210	A	ARGUS	No response to the clear-down (REL sent, no REL_CMP/ REL_ACK received from network)
220	A	ARGUS	Remote end signaled that it is in State 0.
245	E	ARGUS	Keypad sent via ESC, but no response was received from network
250	E	ARGUS	FACility was sent, but no response was received from network

X.31 Test – Error messages

X.31 Causes

- | | | |
|-----------------|---------|---|
| 0 to 255 | Network | See ISO 8208: 1987(E)
Table 5- Coding of the clearing cause field in clear indication packets, page 35 |
| 257 | ARGUS | No answer from network (to a CALL-REQUEST or a CLEAR-REQUEST) |
| 258 | ARGUS | Unexpected or wrong answer from network
(no CALL-CONNECTED or CLEAR-INDICATION as response to a CALL-REQUEST) |
| 259 | ARGUS | The network has indicated in a DIAGNOSTIC message that the logical channel is invalid.
Origin: No (=1) or a wrong LCN was set. |
| 512 | ARGUS | It was not possible to determine an internal or external cause.
Origin: Layer 2 could not be setup or remote end does not support X.31 |
| 65535 | ARGUS | X.31 Layer 3 test was not performed. The error can only occur in a test log. |

X.31 Diagnostic (only for a cause less than 256)

- | | | |
|-----------------|---------|--|
| 0 to 255 | Network | See ISO 8208: 1987(E)
Figure 14A page 121
Figure 14B page 123 et seq.
and/or CCITT Recommendation X.25, Annex E |
|-----------------|---------|--|